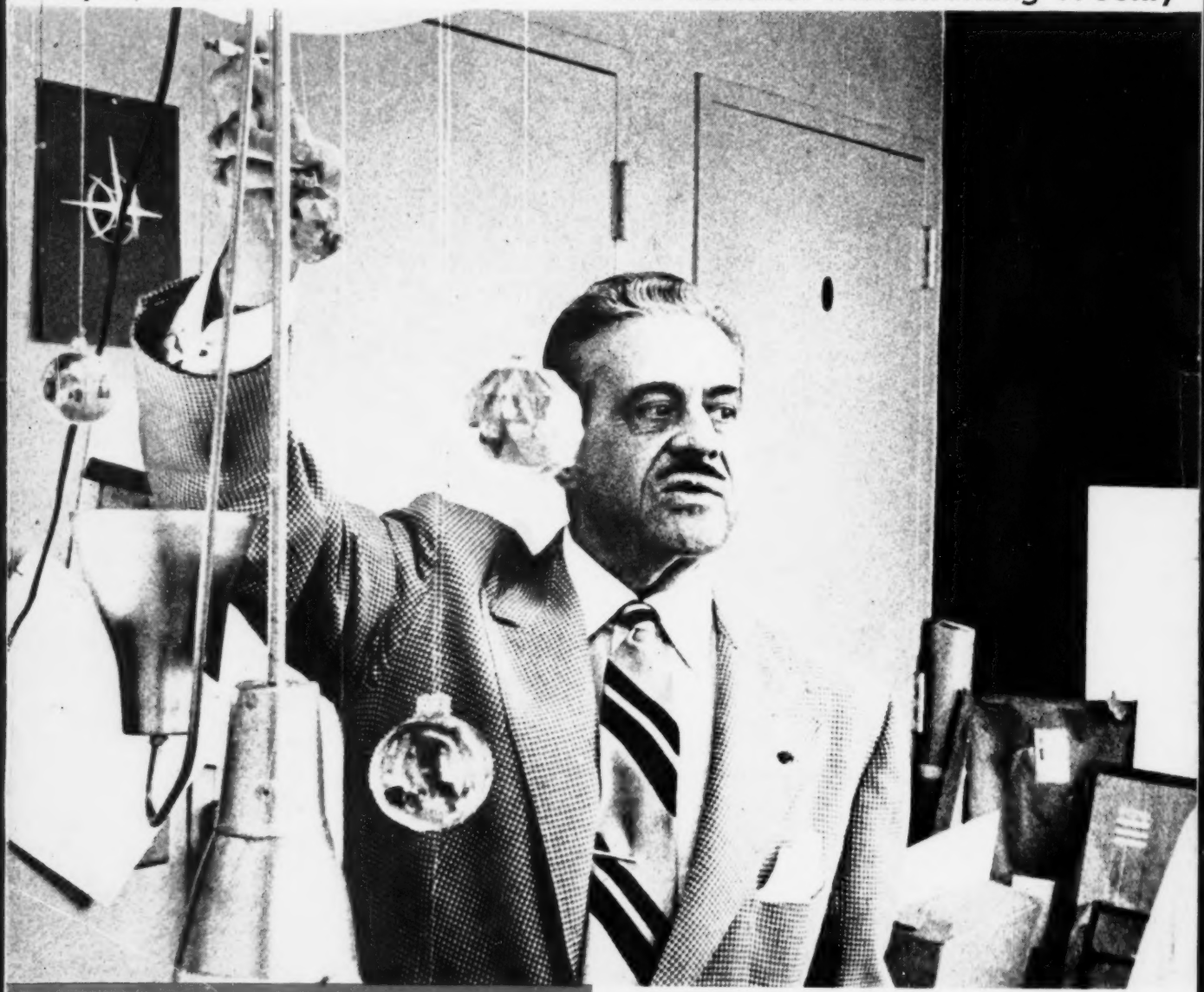
The IRON AGE
May 9, 1957
The National Metalworking Weekly



Raymond Loewy

What to Look For In Designing A New Product P. 67

How To Gear Inventory To Market Trends – P. 70

Vacuum Die Casting Aims At New Markets – P. 107

Digest of the Week P. 2-3

THE OTHER TURN

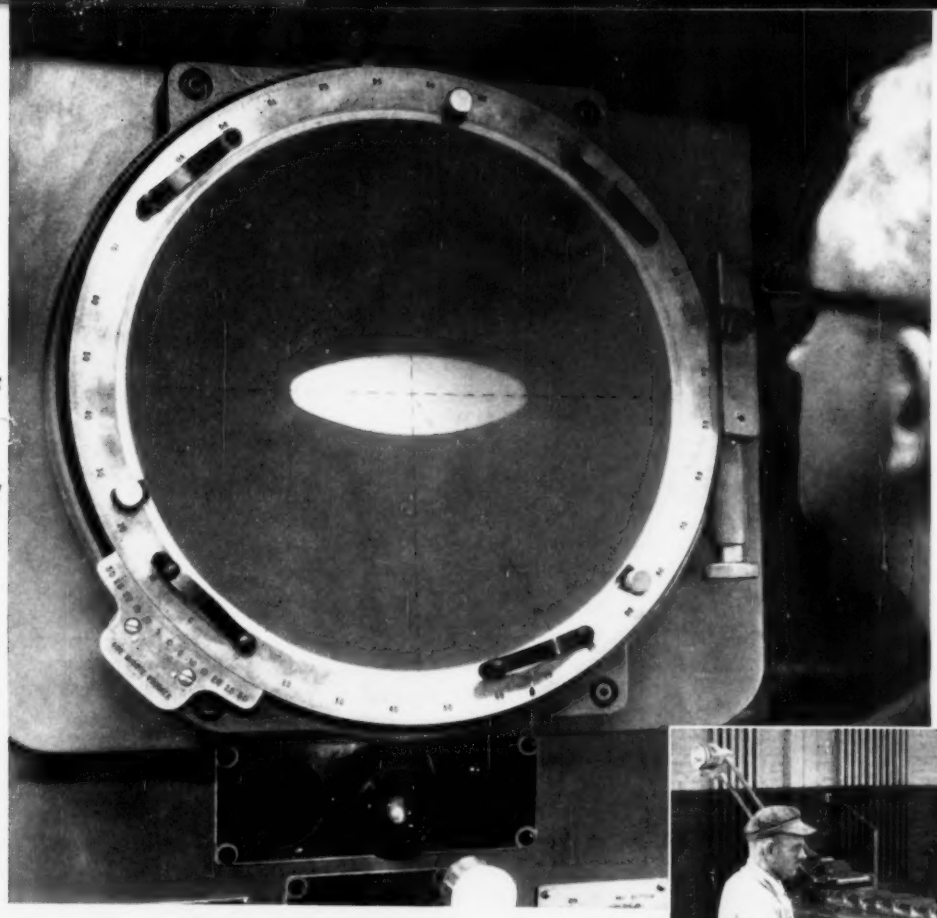
AIN'T THE TAP HOLE IN THE MIDDLE DOOR MARTY?
I'VE HEARD ABOUT THIS, BUT IT'S THE FIRST TIME I EVER SEEN IT!
IT'S GONNA BE A LONG TIME BEFORE THEY LIVE THIS ONE DOWN.
THANKS TO ED GREEN, GENERAL TURN FOREMAN NO 2 OPEN HEARTH YOUNGSTOWN SHEET & TUBE CO. INDIANA HARBOR, INDIANA
KUEKES

The Red Faces

WHY NOT DESCRIBE YOUR OPEN-HEARTH CARTOON IDEA AND SEND IT ALONG TO US?

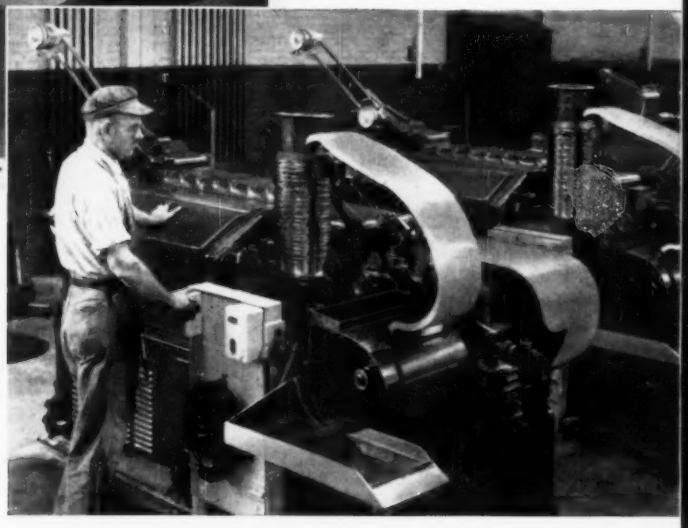
The benefits steelmakers obtain from our refractories are in part a result of Basic's on-the-job servicing. One of the rewards of this close relationship has been the opportunity to observe and appreciate the lighter side of these usually serious craftsmen.

BASIC INCORPORATED 845 HANNA BUILDING • CLEVELAND 15, OHIO



A sample of oval wire is checked for accuracy by an inspector as he studies the image, here magnified 20 times, on an optical comparator.

This battery of continuous, wet-drawing machines is typical of our new facilities for producing fine wire. Note that the machine in the foreground is spooling fine wire as it comes off the block.



Shaped wire and fine wire— Bethlehem specialties

There's nothing "run of the mill" in making shaped and fine wire. That's why we have expanded and re-grouped a special division of our rod and wire mill at Johnstown, Pa. It's our "Fine and Specialty Wire Department," in which we now have a variety of brand-new equipment of the most modern design. It's our latest step towards specializing in the making of fine, flat, and shaped wire.

We're now drawing fine wire to sizes as small as 0.007 in. (40 gage). And we can furnish fine wire with liquor, white-liquor, coppered, and other finishes, including redrawn bethanized—electrolytically coated with 99.9-per-cent pure zinc. We have the equipment to offer fine wire in a wide range of spool sizes. And we have the heat-treating facilities, drawing blocks, and other equipment to provide a wide variety of tempers and physical properties.

We regularly make flat, square, octagon, hexagon, oval and an increasing number of other shapes. Shaped wire offers many advantages to the fabricator. For example, oval wire has more surface than round wire of the same cross-sectional area. This feature, for example, is useful in reinforcement applications where the greater surface area improves cohesion between the material to be reinforced and the steel wire itself.

We've never been in such a good position to offer prompt delivery of shaped and fine wire in production quantities. The nearest Bethlehem sales office will give you the details. And you can be sure that our people in the mill, as well as in the sales office, will work with you all the way.

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The IRON AGE

May 9, 1957—Vol. 179, No. 19

Digest of the Week in

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Keeping Guesswork Out Of Inventory

Modern evaluation of inventory control can trim a large percentage of inventory costs. How to arrive at the ideal level of inventory is not a subject for guesswork. **P. 70**

How Wall Street Looks At Steel Stocks

Since the mild downturn in steel business, Wall Street has been re-

appraising steel stocks. That's why steel shares have been losing ground. This is an analysis of what's happening and why. **P. 72**

Why Auto Sales Are In A Slump

A large segment of the auto buying public apparently has over-extended itself. They are still paying for their 1955 models on a 36-month credit plan. But while the effect of easy credit is catching up with the industry, so are higher prices. **P. 84**

Fight Looms Over Fast Tax Write-Offs

Fast tax amortization may be down but it is not out. The Eisen-

Metalworking

DESIGN TIPS: If you are concerned with the creation or redesign of products, what Raymond Loewy has to say may interest you. The noted industrial designer tells how to shoot for best customer appeal, production efficiency, and service life. **P. 107**

hower Administration believes it is a valuable tool in a changing world. Basic authority is needed, even if little aid is granted. **P. 89**

Detroit Throws A Blockbuster At Machine Tool Makers

The auto industry wants complete standardization of in-line transfer machine setups. The reason: auto parts redesign is obsoleting much machinery with lots of life left. **P. 93**

FEATURE ARTICLES

Vacuum Die Casting Technique Eliminates Porosity

Most troubles that develop in conventional die castings are caused by porosity. A new vacuum casting method, that is simplicity itself, virtually guarantees a better product and fewer rejects. The process shows signs of boosting die-casting use to new heights. **P. 107**

Trucks Teamed With Cranes Offer Flexible Handling

Plants which have constantly changing production schedules can unload many material handling headaches by using cranes in concert with industrial trucks. One firm is getting the most out of its material handling equipment this way. Two basic types of containers speed handling. **P. 110**

Scrapyards Settle Smoke Problems With Incenerator Controls

Getting salavaged metals ready for re-use poses problems for scrap dealers. Burning is the most efficient way to strip the metal bare, but the smoke nuisance is bringing pressure from anti-air poilution groups. One way out is use of incinerators. **P. 114**

Should Job Shop Platers Automate?

Productivity among job shop platers has jumped at least 25 pct in 10 years. Automation helped do this. Even small independent shops now profitably plate two to 50 lb batches. **P. 118**

Sodium Process Extracts Titanium In Commercial Tonnages

Use of sodium for recovering titanium has several advantages. One is the prospect of continuous processing at high yields. Two firms are using the method. **P. 120**

MARKETS & PRICES

How to Buy Materials Handling Equipment

Record crowd at National Materials Handling Exposition found wide variety of machinery. Dow Chemical executive gives valuable pointers on how to select the right type of equipment. **P. 74**

Will Steel Prices Rise More Than Expected?

There's a chance that steel prices will go up more than the talked-about $5 to $6 a ton. Steel mills say their wage costs will rise some 20¢ an hour next July. Price boost could be near $8. **P. 75**

Powdered Metal Is Ready To Roll

Commercial tonnages of copper strip from powder are soon to be a reality. E. W. Bliss' mill is almost finished and several more are under construction or planned. **P. 76**

Metalworking's Growth in West Benefits Suppliers

Steady flow of new firms opening for business and existing ones enlarging means lots of business for suppliers. Here's a checklist of new and expanding companies. **P. 91**

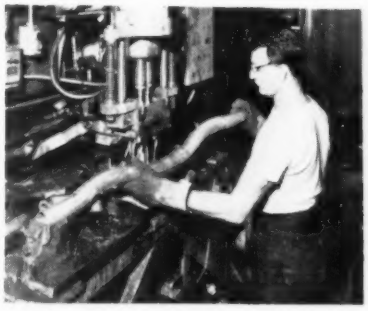
Mills Pin Hopes on an August Upturn

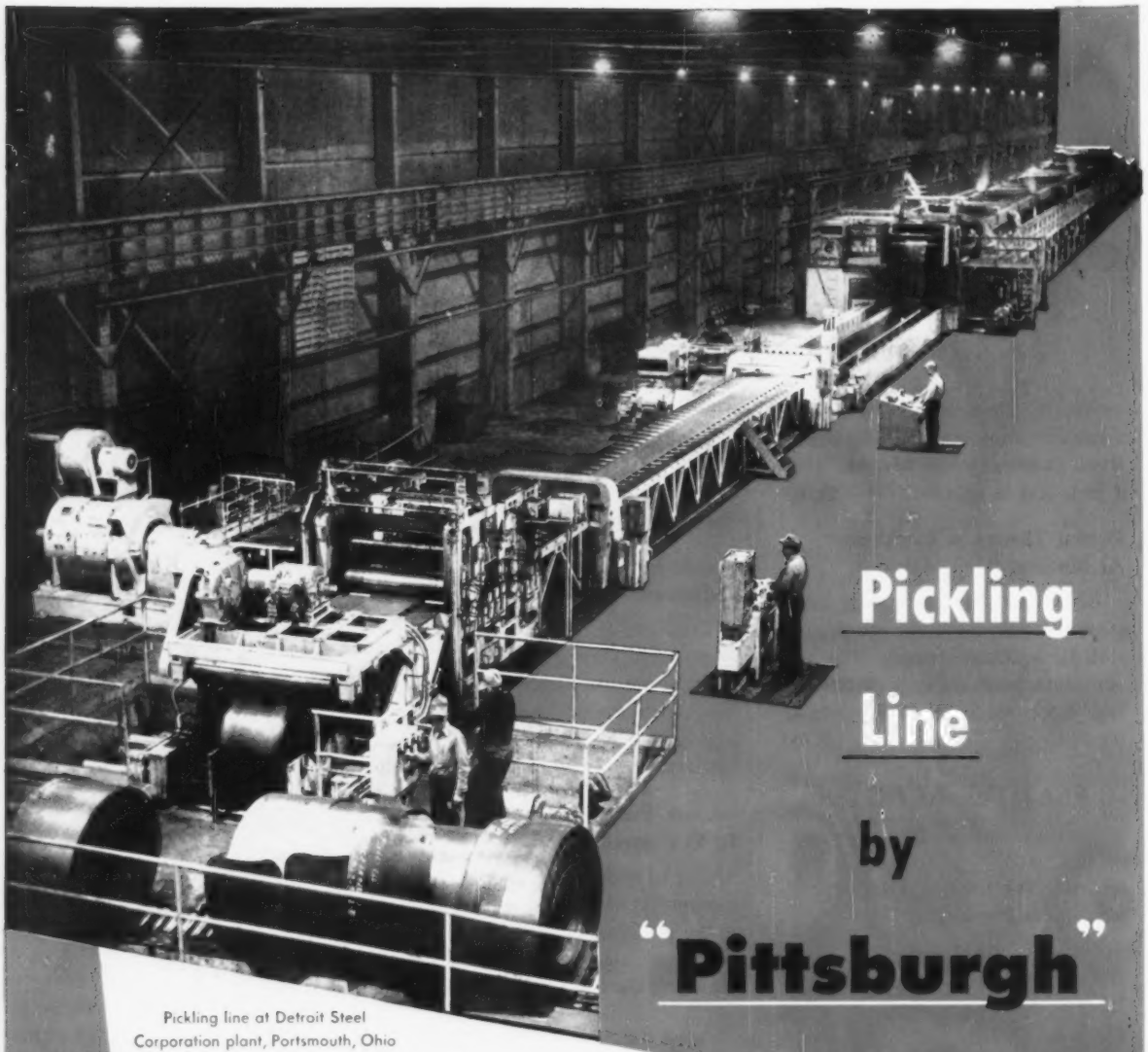
A revival of appliance and automotive ordering in August is the latest hope of sheet and strip mills. They may also get an extra bonus from hedge buying against expected steel price boost. **P. 165**

NEXT WEEK

The True Story Behind Auto Parts Suppliers

Reports of diversification, bankruptcies, mergers give the impression the industry is dying out. But that is far from the case. Next week's feature will show suppliers are deeper in metalworking than ever.





Pickling line at Detroit Steel Corporation plant, Portsmouth, Ohio

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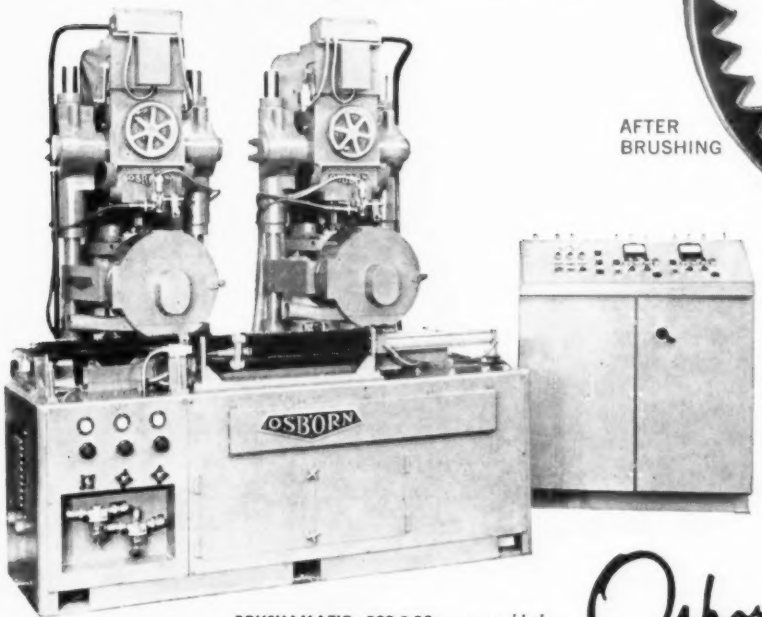

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Armed Forces Day

Go See What You Pay For

If we are wise we will take up the military services' open house invitation. The show starts on May 18. Throughout the world that is Armed Forces Day.

Again the theme is Power for Peace. Before we go to see what a great fighting force we have, let's do a little homework.

All of us want lower taxes. We crave less spending—by our government. The hassle over the budget is the biggest in years. All of us insist we are sincere in our demands.

So far, much of this is wishful thinking. We, the people, are the only ones able to tell Congress and the President what we want. We can't have our cake and eat it too.

Before we call our nearest Armed Service center to get the dope on the open house, let's remember that the cold war still goes on; that the Communists never were in this game for marbles.

There is much talk of cutting the defense budget. Some of this talk is stupid. Cutting the defense budget isn't that easy. When we look at our military services and see what we are paying for, we'll know why.

It is stylish in some circles to put the military in its place. That is well and good if the military usurps civilian prerogatives. But our military leaders are intelligent, patient, courteous—and dedicated. It is our duty to understand what they are trying to do and what they have done for our security.

We will have our chance to check up on: the Army, Navy, Air Force, Marine Corps, Coast Guard, National Guard, Reserve Forces, Civil Air Patrol and Ground Observer Corps. Our areas will be the scene of many activities that will give us a new insight into what protection we have.

When we go to bed tonight let's think about the safety we accept automatically. We would not have that assurance were it not for our defense budget, for our Armed Services' dedication and for the fact that we are a democracy.

While we ponder our defense against sudden and horrible death, let us remember too that we are eating our cake—and making no real sacrifices. When we think of our military services, let's place them in their proper light; along with our total safety.

We should go see the show on May 18 no matter where we are: let's see what we pay for.

Tom Campbell

Editor-in-Chief

Another Goodyear First:

V-Belts

with the Green Seal

stay matched from factory to drive

The Green Seal signifies true dimensional stability. It means that now when you reach for a matched set of V-belts, you can be sure they're matched – no matter how long they've lain on the shelf. And that means longer life and a minimum of down time.

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The next time you need V-belts, be sure they're wearing the Green Seal–the mark of a V-belt made with the technical know-how of the world's largest rubber company. They're readily available at your Goodyear Distributor. Or write for details to Goodyear, Industrial Products Division, Lincoln 2, Nebraska, or Akron 16, Ohio.

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LETTERS FROM READERS

White Collar Drive

Sir—We are a firm of business and engineering consultants specializing in the field of public utilities.

In your Apr. 11 issue you have an excellent story "Brace for White Collar Drive" by the George S. Odiorne.

Please send me 15 reprints of this article, if you can spare that many. I want to send them to the presidents of 15 electric light and power companies whom we serve. —R. M. Winsborough, Vice Pres., Middle West Service Co., Chicago.

▪ Copies are on the way.—Ed.

Finishing Problems

Sir—Congratulations on one of the finest and most comprehensive articles I have ever read on organic finishing in your Mar. 21 issue.

It sums up for management the problems of the finishing department in the best way possible. Many times we have tried to tell and sell these same facts—plus many more we never realized.—C. Maxon, Metal Finishing Supv., The Astatic Corp., Conneaut, O.

Fast Write-Offs

Sir—Please send me six reprints of the Special Report "Why We Must Limit Fast Tax Write-Offs" by George M. Humphrey, in the Apr. 18 issue.—W. F. Hoelscher, Secretary and Asst. Treasurer, Granite City Steel Co., Granite City, Ill.

Resistance Welding

Sir—Your article in the Apr. 18, 1957, issue entitled "Eight Basic Resistance Welds Cut Costs on Short Runs" was most interesting. Our company does an appreciable amount of arc welding of small components and we have resistance welding equipment that could readily be converted.—R. L. Gates, Project Engr., United Steel Fabricators, Inc., Wooster, Ohio.

Government Buying

Sir—In the Apr. 4 issue of THE IRON AGE you mentioned that reprints of the article "How To Deal With Washington," were available while the supply lasted. I found this article quite interesting, and I would appreciate it if you could send me a reprint of it. —O. D. Colvin, Jr., Sylvania Resident Representative, Sylvania Electric Products, Waltham, Mass.

Skilled Labor

Sir—We were so impressed by the article titled, "How to Build Your Skilled Labor Force," which appeared in the Feb. 14 issue of THE IRON AGE, that we would like to purchase 5,000 reprints of it for distribution.—C. S. Keefer, Chief Information Officer, U. S. Dept. of Labor, Bureau of Apprenticeship and Training, Washington.

"You're the first one here in the morning, the last to leave and you haven't made a mistake in twenty years. Just what are you up to, Wilson?"

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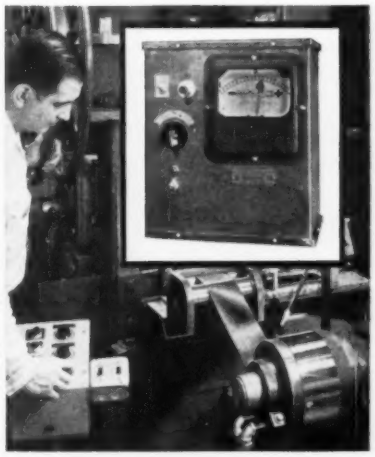

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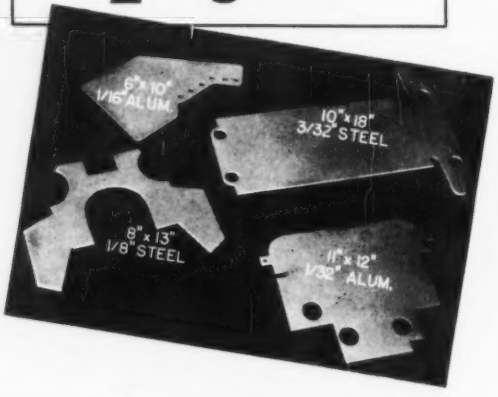

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1/16 STEEL	100,000	UNKNOWN
3/32 STEEL	75,000	UNKNOWN
1/8 STEEL	50,000	UNKNOWN

MAXIMUM UNKNOWN AS DIES HAVE NEVER BEEN RUN TO DESTRUCTION

MINIMUM PRODUCTION ON ALUMINUM AND SIMILAR METALS

THICKNESS	MINIMUM	MAXIMUM
1/16 ALUMINUM	125,000	UNKNOWN
3/32 ALUMINUM	100,000	UNKNOWN
1/8 ALUMINUM	75,000	UNKNOWN
5/32 ALUMINUM	50,000	UNKNOWN
3/16 ALUMINUM	40,000	UNKNOWN

MAXIMUM UNKNOWN AS DIES HAVE NEVER BEEN RUN TO DESTRUCTION

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OVER A QUARTER OF A CENTURY OF DIE MAKING SERVICE TO INDUSTRY

FATIGUE CRACKS

Eye Catcher

"Good design keeps the user happy, the manufacturer in the black and the aesthete unoffended." This sums up the business philosophy of industrial designer Raymond Loewy. His cover article on p. 67 of this week's issue bears this out.

But neither this quote nor the article gives much of a clue to the colorful Loewy career.

Early Talent—Born in Paris and educated in French engineering schools, he showed his talents early by designing a model airplane

Loewy at chateau near Paris

which won the J. Gordon Bennett Medal in 1906. His schooling was interrupted by World War I in which he served as a captain in the French army. He is a holder of the Legion of Honor and the Croix de Guerre with four citations.

It was not until he came to this country that he achieved his greatest fame. Starting out as a fashion illustrator, he soon switched to industrial designing and founded his own firm in 1927. He later became a U. S. citizen.

Prize - Winner—His refrigerator design won first prize at the Paris International Exposition in 1937. He designed the 1952 Studebaker and in the same year the interiors of the famous glass and metal office building of Lever Bros. in New York.

Other well-known projects include the "Highway Traveler" buses for Greyhound, farm equipment for International Harvester, and the first design change of sewing machine cabinets for Singer in thirty-eight years.

Inventory Control

Do you know that the average company has 85 pct of its inventory money tied up in 15 pct of its parts and materials?

Or do you realize fully the fundamental that the value of your inventory increases as it progresses through a plant?

Most manufacturing executives are vaguely aware of the futility of applying the same records and controls to a 3¢ cotter pin as to a casting worth thousands of dollars. But many of them still do so.

Tight Money—George McManus, Pittsburgh editor of IRON AGE, realized the importance of inventory control, particularly in view of today's tight money situation, when every dollar tied up unnecessarily is a dollar wasted.

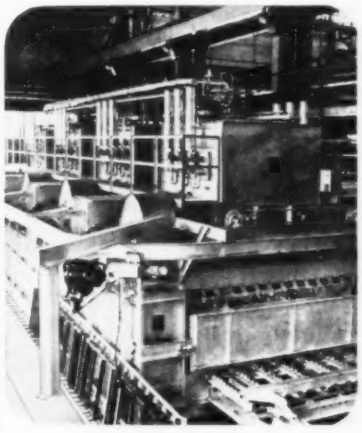
On p. 70 of this week's issue, you will find his detailed analysis of both the fundamentals and fine points on inventory control, as practiced by some of the leading manufacturing companies and as applied by leading management consultants.

New Puzzler

Mr. Simpson met a friend whom he had not seen for many years. The friend said, "I married, shortly after I last saw you, someone you never knew. And this," presenting a young girl, "is my daughter. Her name is the same as her mother's." Mr. Simpson patted the child on the head and said, "I am glad to know you, Margaret," and resumed his conversation.

How did he know the child's name was Margaret?

HEAT TREATS ALUMINUM ALLOYS UNIFORMITY ±2°F.



R-S FURNACES AT WYMAN-GORDON KEEP QUALITY UP ... COSTS DOWN

Where aluminum alloy forgings for 18,000 ... 35,000 ... and 50,000 ton presses must be heat treated to absolute uniformity R-S Furnaces were entrusted with the job. Six R-S Furnaces at Wyman-Gordon Products Corporation handle all types and sizes of forgings with extreme flexibility and maintain a uniformity of plus or minus 2° F. to 1100° F. Work is pushed thru furnace in steel trays in two rows on roller rails. Every piece emerging has absolute uniformity regardless of size, shape or weight.

For higher quality in heating and forging write for the illustrated folder giving full technical details to...

R-S FURNACE CO., INC.
Philadelphia 44, Pa.

IHEA

Car Hearth Furnaces
Continuous Furnaces
Rotary Type Furnaces

R-S FURNACES

Perfect for the job!

VANCORAM EXOKROM®

Exothermic Ferrochromium Alloy

Vancoram EXOKROM is the result of years of concentrated research and development in the laboratory, pilot plant and in the field. It is ideal for the production of low-alloy chromium steels used in hundreds of constructional applications.

Low cost and high chromium recovery with a minimum of objectionable fumes and flames are some of the outstanding qualities of EXOKROM.

Addition is easy. It is done right in the ladle. Vancoram Exokrom is packed in readily identified cans containing 25 lbs. of chromium, and cans are packed in crate-pallets for easy handling. Weighing and measuring are eliminated. Where large heats are treated, the complete pallet load can be placed in the ladle.

For more facts, call your nearest Vanadium Corporation office. Or write us today.

Visit us at AFS Engineered Castings Congress, May 6-10, Hotel Sinton, Cincinnati, Ohio

VANADIUM CORPORATION OF AMERICA

420 Lexington Avenue, New York 17, N. Y. • Chicago • Cleveland • Detroit • Pittsburgh

Producers of alloys, metals and chemicals

EXHIBITS, MEETINGS

Design Engineering Show — May 20-23, New York. (Clapp & Poliak, 341 Madison Ave., N. Y. 17).

Packaging & Handling Show—Oct. 28-31, Atlantic City. (SIPMHE, One Gateway Center, Pittsburgh 22).

Metal Show—Nov. 2-8, Chicago. (American Society for Metals, 7301 Euclid Ave., Cleveland 3).

MAY

Copper & Brass Research Assn.—Annual meeting, May 12-15, The Homestead, Hot Springs, Va. Society headquarters, 420 Lexington Ave., New York.

The Electrochemical Society—Annual meeting, May 12-16, Statler Hotel, Washington, D. C. Society headquarters, 216 W. 102nd St., New York.

Rail Steel Bar Assn. — Annual meeting, May 13-15, Broadmoor Hotel, Colorado Springs. Society headquarters, 38 S. Dearborn St., Chicago.

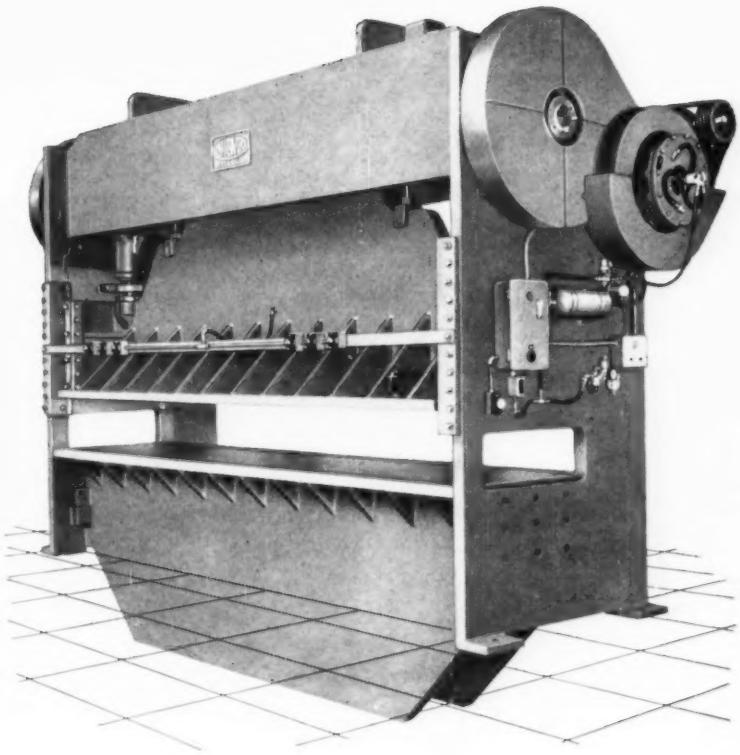
American Mining Congress—Coal convention and exposition, May 13-16, Public Auditorium, Cleveland. Society headquarters, 1200 18th St., Washington.

The American Society of Mechanical Engineers — Wood Industries Div. — Conference on automation in woodworking, May 16-17, Winston-Salem, N. C. Society headquarters, 29 W. 39th St., N. Y.

American Institute of Mining and Metallurgical Engineers — Metals Div.—New England regional conference on melting and solidification—May 17-18. Hotel Statler, Boston. Information: John J. Burke, Watertown Arsenal, Watertown, Mass.

Industrial Heating Equipment Assn. —Spring meeting, May 19-22. The

Continued on P. 16



CHICAGO DREIS & KRUMP

PRESSES
STRAIGHT-SIDE TYPE

large die area
capacities up to 400 tons

This is a typical model of CHICAGO straight-side-type presses used for multiple punching, notching, and trimming operations. This press with a die area of 48 inches by 198 inches has a capacity of 200 tons.

Complete recommendations for any job on request.

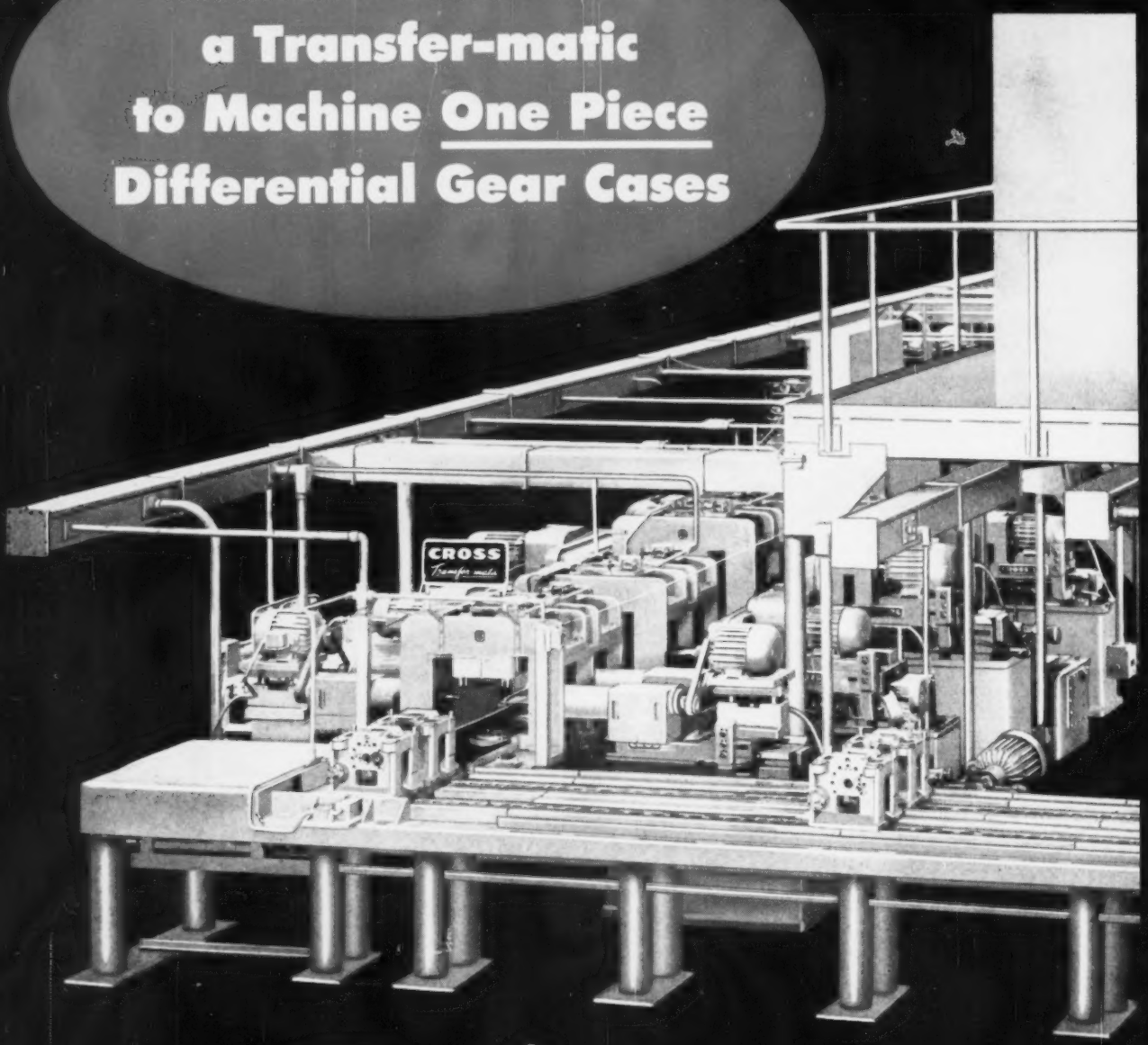
6674

CHICAGO DREIS & KRUMP

Press Brakes • Straight-Side-Type Presses • Press Brake Dies
Hand and Power Bending Brakes • Special Metal-Forming Machines

DREIS & KRUMP
MANUFACTURING CO.
7430 South Loomis Boulevard, Chicago 36, Illinois

Another Cross First – a Transfer-matic to Machine One Piece Differential Gear Cases



Cutaway view of differential gear case showing machined surfaces.

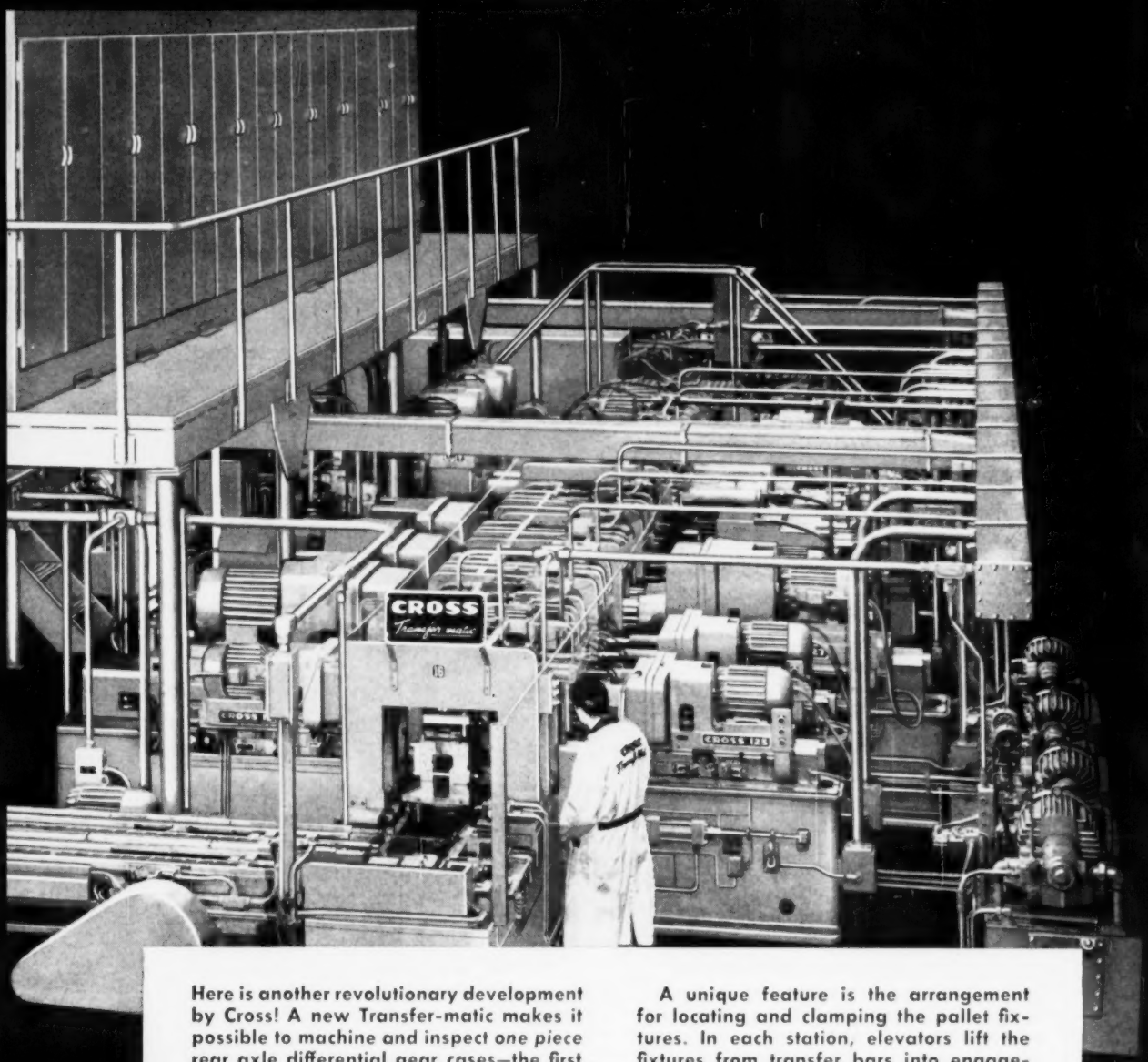
Established 1898

THE CROSS CO.

First in Automation

PARK GROVE STATION • DETROIT 5, MICHIGAN

Another Transfer-matic by Cross



Here is another revolutionary development by Cross! A new Transfer-matic makes it possible to machine and inspect *one piece* rear axle differential gear cases—the first time such a part has been processed on a transfer machine.

Two cases are machined at a time as they travel a distance of 206 feet through 30 stations. Rated capacity is 212 pieces per hour at 100% efficiency. Operations include rough and finish forming the two spherical seats for the pinions; rough and finish boring and facing the two seats for the side gears; drilling, boring and reaming the pinion shaft hole; drilling and reaming the lock pin hole; drilling, chamfering, spotfacing and reaming the twelve ring gear mounting holes.

A unique feature is the arrangement for locating and clamping the pallet fixtures. In each station, elevators lift the fixtures from transfer bars into engagement with locating pins and stop buttons fixed in the overhead bridge structures. Individual wedges then back up the elevators to secure the pallets. After cutting, the elevators lower the pallets onto the transfer bars, which carry them to the next station.

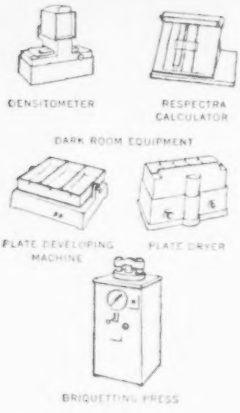
Other features include construction to JIC Standards, hardened and ground ways, complete interchangeability of all standard and special parts, pre-set cutting tools and Cross Machine Control Units which program tool changes to reduce machine downtime.

NEW ***ARL-B&L COMBINATIONS provide integrated spectrographic laboratories—with ARL field service***

Two outstanding instrument lines have joined forces. Together, they bring new completeness and versatility to the spectroanalytical laboratory. Applied Research Laboratories' field representatives now sell, install and service Bausch & Lomb spectrographs, together with the fully compatible and widely used ARL source units, densitometers and associated equipment.

*Typical example of new ARL-B&L versatility: a B&L Dual Grating Spectrograph with ARL Arc-Spark Stand, mounted on the ARL Multisource.**

ARL ACCESSORY EQUIPMENT



Thus, with compact, integrated analytical instrumentation available, the opportunities for you in the many new combinations are great. And the man with the knowledge is your nearby ARL engineer. His service skill is immediately available on B&L spectrographs, as well as ARL Quantometers, Quantographs* and other advanced optical and x-ray emission equipment.*

Your inquiry will be answered in detail.

*TRADEMARK

Applied Research Laboratories
SPECTROCHEMICAL EQUIPMENT
3721 PARK PLACE • GLENDALE 8, CALIFORNIA
NEW YORK • PITTSBURGH • DETROIT • CHICAGO • DALLAS • LOS ANGELES • LAUSANNE, Switzerland • LONDON, England

EXHIBITS, MEETINGS

Continued from P. 13

Homestead, Hot Springs, Va. Society headquarters, 1145 19th St., N.W., Washington, D. C.

American Iron and Steel Institute—65th general meeting of members, May 22-23, Waldorf-Astoria Hotel, New York. Society headquarters, 150 E. 42nd St., New York.

American Society For Quality Control—Eleventh annual convention, May 22-24, Sheraton-Cadillac Hotel, Detroit. Information: Wade R. Weaver, Registrar, Republic Steel Corp., Cleveland 1, O.

American Institute of Steel Construction—Annual national engineering conference, May 27-28, Edgewater Beach Hotel, Chicago. Society headquarters, 101 Park Ave., New York.

Institute of Mining and Metallurgical Engineers—Southern Calif. Section—Regional reactive metals conference, May 28-29, Ambassador Hotel, Los Angeles. Society headquarters, 29 W. 39th St., New York.

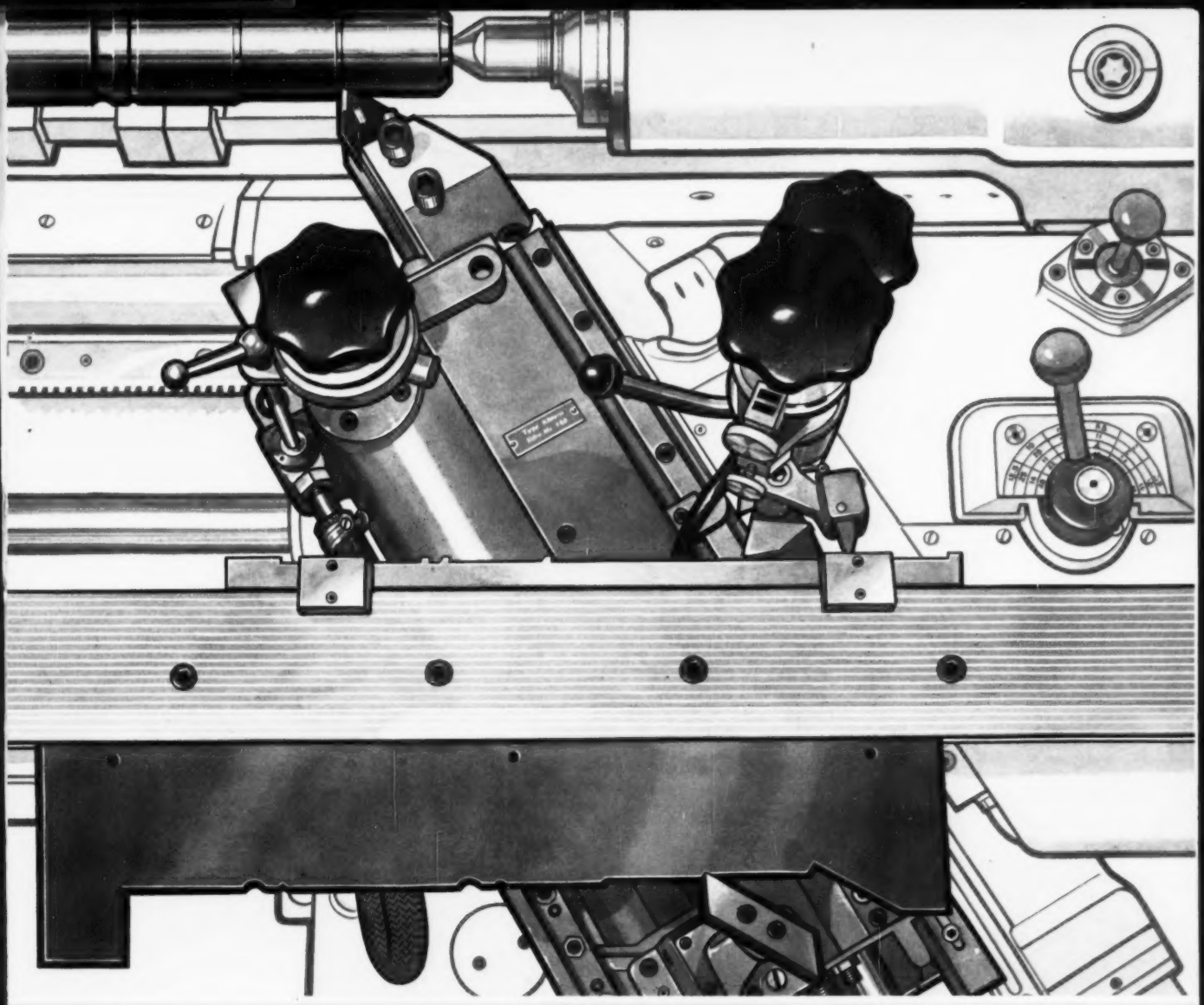
JUNE

Institute of Radio Engineers—National symposium on production techniques, June 6-7, Hotel Willard, Washington, D. C. Information: 609 Monticello Dr., Falls Church, Va.

The American Society of Mechanical Engineers—Semi-annual meeting, June 9-13, Sheraton-Palace, San Francisco, Calif. Society headquarters, 29 W. 39th St., N. Y.

Malleable Founders' Society—Annual meeting, June 13-14, The Broadmoor, Colorado Springs, Colo. Society headquarters, 1800 Union Commerce Bldg., Cleveland.

Pressed Metal Institute—Annual national sales conference for the metal stamping industry, June 14, Hotel Carter, Cleveland. Society headquarters, 3673 Lee Rd., Cleveland.



New Britain +GF+ outproduces multi-tool lathes with a single tool

How can one tool outproduce several? The answer is — maintain dimensional relationships with a template or prototype instead of a multi-tool setup. This cuts tool changeover time to practically zero.

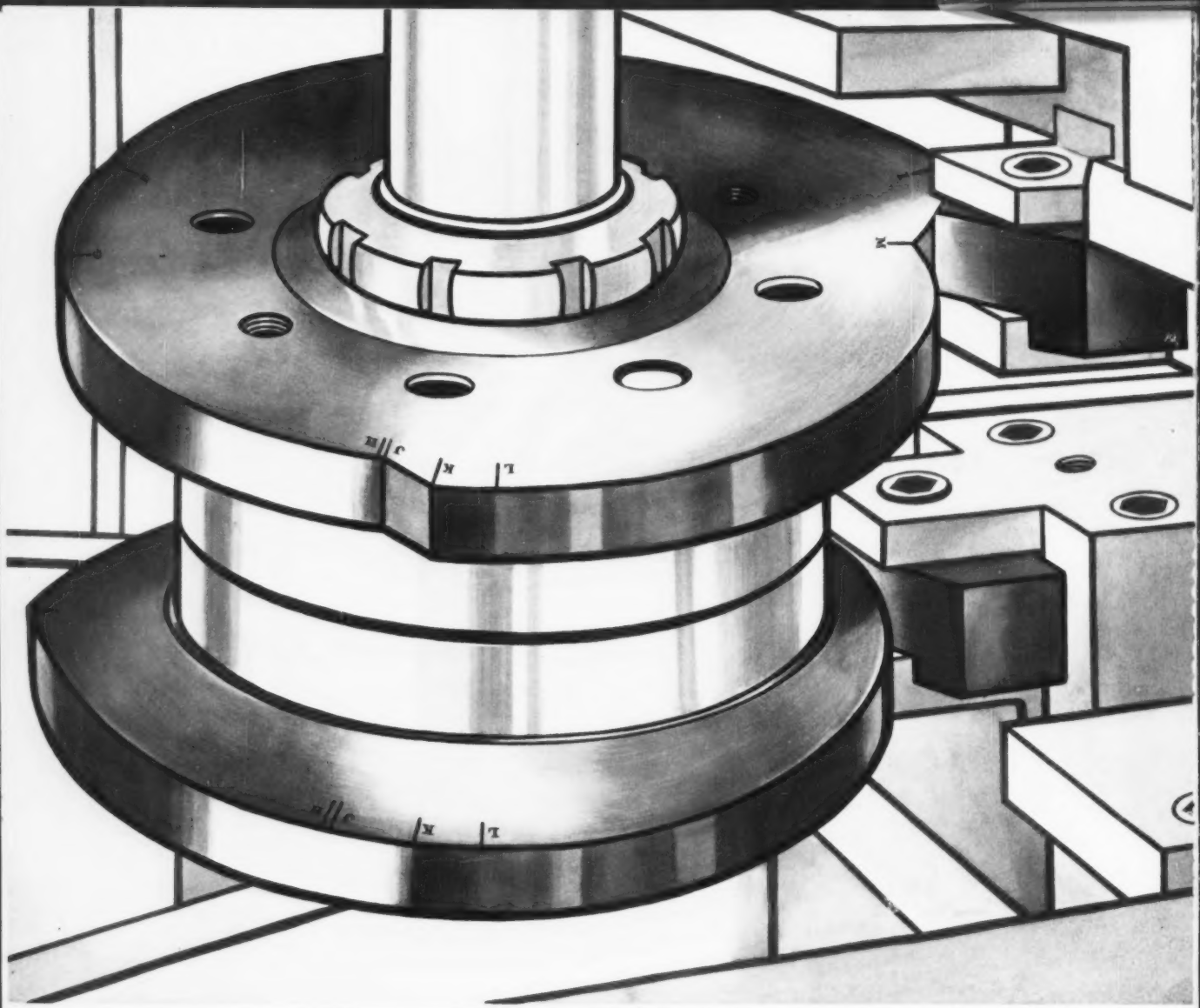
On the New Britain **+GF+** copying lathe, you can cut at maximum speeds and feeds for tool efficiency without worrying about tool wear and the delicate readjustment of several cutting tools. When the tool wears, change it, bring one dimension to size. The other dimensions have to be right. Your choice of a New Britain **+GF+** means elimination of any extra operation to bring pieces within grinding tolerances.

Machines from New Britain's three machine tool divisions incorporate the *basic principles* of more profitable production.

THE NEW BRITAIN MACHINE CO.

New Britain +GF+
Copying Lathe

NB



cams put the precision in precision boring

When you are working to "tenths" cams are your best method of maintaining accuracy, because cam control of the tool is *positive* control. The accuracy of parts produced on New Britain boring machines *can't* be affected by variable hydraulic pressures, ambient temperature, or play in complicated linkages.

In boring machines or *any* machine tool investment, be sure your most important requirements are met, not by gadgets, but by the fundamental design principles employed. The New Britain Machine Company, New Britain-Gridley Machine Division, New Britain, Connecticut.

THE NEW BRITAIN MACHINE CO.
Precision Boring Machine
NB

NOW! USS Gerrard AUTOMATIC STRAPPING MACHINE

Fully Tested, Tried and Proven

See this USS Gerrard Automatic Strapping Machine in our booth at the National Materials Handling Show, Convention Hall, Philadelphia, April 29 to May 3.

Where automation is important to your packaging and bundling problems, the USS Gerrard Model 12 Automatic Round Steel Strapping Machine is the answer to your needs. This machine has thoroughly proved its efficiency and trouble-free operation. Here, briefly, are some of its many advantages:

LOW COST—This is one of the lowest cost automatic strapping machines on the market today.

COMPACT—Requires only 11½ sq. ft. of floor space. Table height, 31". Weight (approx.), 1500 lbs.

SPEED—Up to 24 ties per minute.

TWO SIZES—Either machine will handle packages as small as 8" wide by 2" high. The larger will handle packages as large as 26" wide by 20" high.

EASY TO OPERATE—Utilizes USS Gerrard Round Steel Strapping from 14 through 18 gauge. Easy to thread and operate.

LOW MAINTENANCE—One-shot, built-in lubrication system and compact, rugged, simple construction mean minimum service and maintenance.

TENSION—Can be predetermined, and when set is uniformly maintained on all packages regardless of size or weight.

SINGLE POWER SOURCE—All functions are mechanically controlled and interlocked. Simply plug in and run.

PACKAGES which vary in size and shape can be strapped without adjustment to machine.

COMPRESSION DEVICE for pre-compressing packages or bundles can be supplied as optional equipment.

QUIET OPERATION—Fully engineered to eliminate noise and vibration.

For more complete details, contact your USS Gerrard sales representative. Also mail coupon for folder and the Gerrard Blue Book of Packaging. This contains full information on all USS Gerrard Machines and round and flat strapping.

GERRARD STEEL STRAPPING DIVISION, UNITED STATES STEEL CORPORATION
GENERAL OFFICES: CHICAGO, ILLINOIS

USS

USS GERRARD STEEL STRAPPING

Round and Flat

UNITED STATES STEEL

USE THIS COUPON

Gerrard Steel Strapping Division
United States Steel Corporation
4711 S. Richmond St., Chicago, Illinois

Please send me folder on the Automatic Strapping Machine and the 36-page GERRARD Blue Book of Packaging. No obligation.

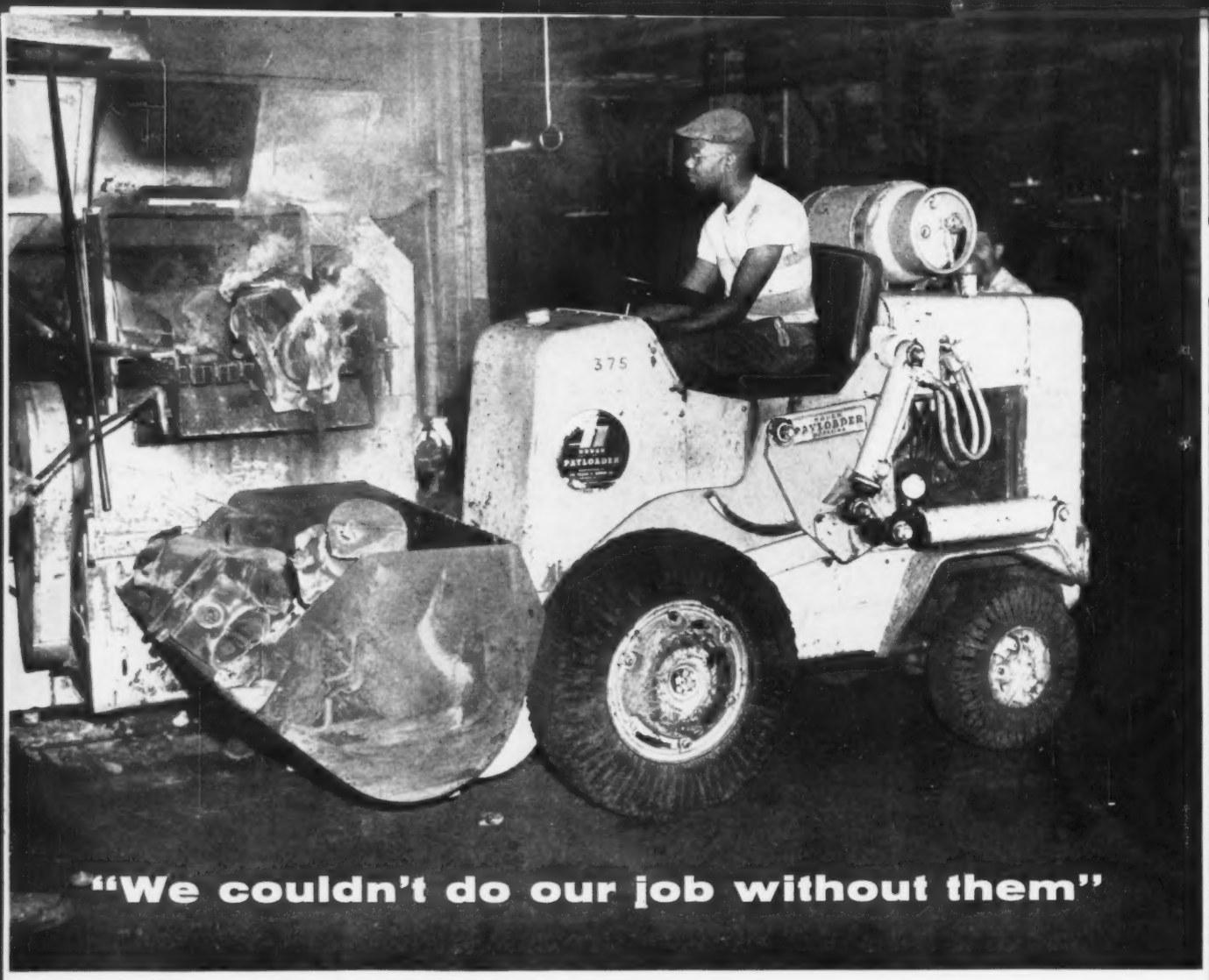
Name

Company

Address

City State

Have Salesman Call ☐



Robert Shea, Crouse-Hinds' foundry engineer says, *"This type of shakeout operation could not be carried out without the services of the 'PAYLOADER' units. Due to the versatility and ruggedness of the 'PAYLOADER' tractor-shovels we were able to install molding systems which increased production 30% and substantially reduced risks of injuries from lifting and handling hot castings. We couldn't do our job without them."*

Crouse-Hinds Company, Syracuse, N.Y., is a foremost manufacturer of electrical equipment including conduit fittings, floodlights, airport lights and traffic signals. In its foundry, three model HA "PAYLOADER" tractor-shovels play an important part in an ingenious and efficient production line.

During the pouring operations, these versatile tractor-shovels stand by the end of the pouring-conveyor line. As fast as the jackets are removed, the molds are pushed from the conveyor into a "PAYLOADER" bucket and are carried and dumped on the shakeout. As the castings come off the end of the shakeout they drop into a waiting "PAYLOADER" bucket, as shown in the illustration, and are whisked away to the core-knockout room. These three model HA's also deliver sand from the mixer to the molding stations.

A variety of extra attachments are available to interchange quickly with its bucket and enable the model HA to do other useful jobs — tine bucket, lift fork, pick-up sweeper, castered scrap hoppers. A nearby Distributor is ready to demonstrate what a model HA or a larger "PAYLOADER" can do for you on *your* jobs.

THE FRANK G. HOUGH CO.
733 Sunnyside Ave., Libertyville, Ill.

- ☐ Model HA (1¾ cu. ft.) and HAH (1 cu. yd.)
- ☐ Larger models up to 2¼ cu. yd.

Name _____

Title _____

Company _____

Street _____

City _____ State _____

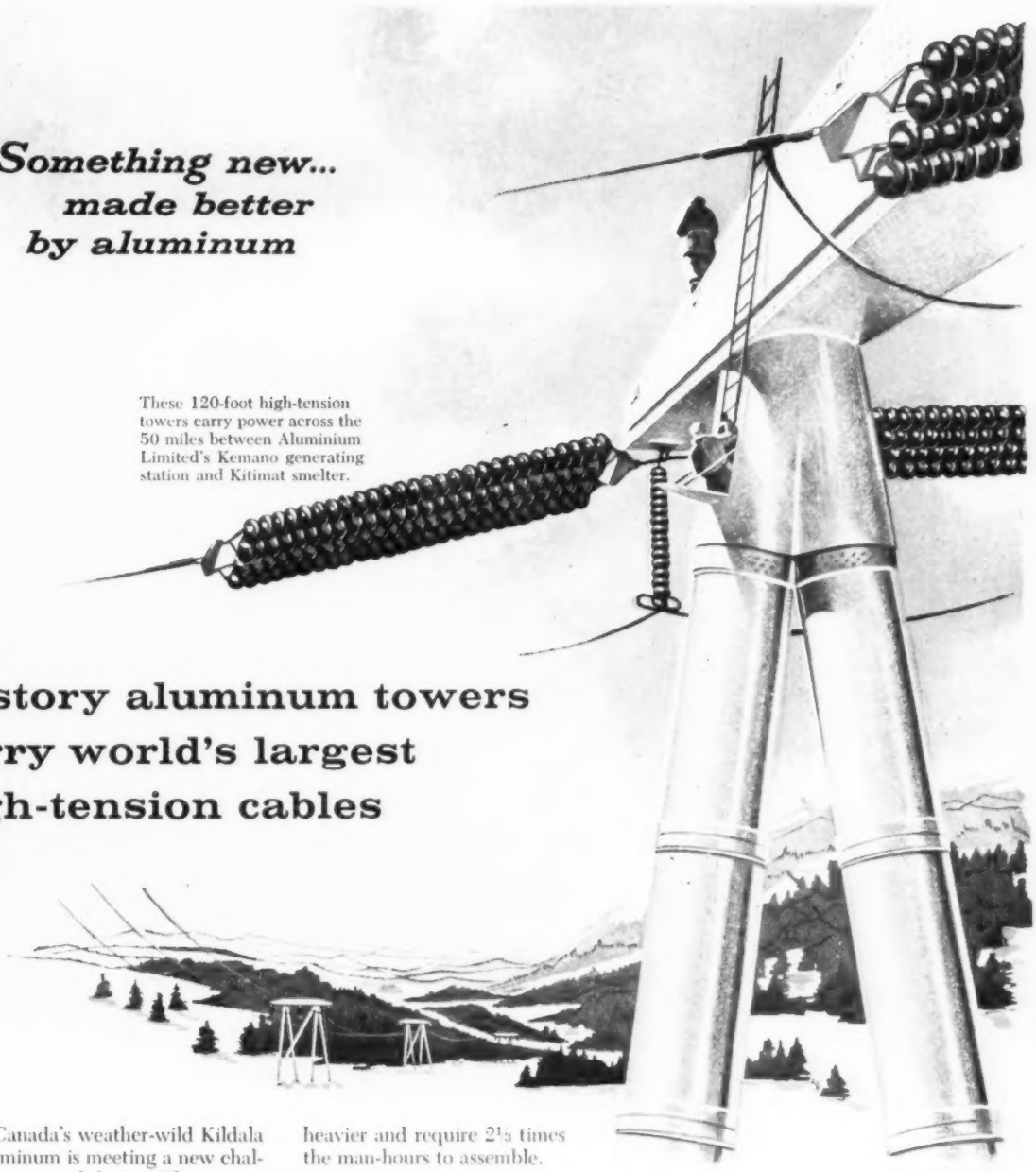
78

SAY "HUFF"

PAYLOADER®

MANUFACTURED BY
THE FRANK G. HOUGH CO. LIBERTYVILLE, ILL.
SUBSIDIARY—INTERNATIONAL HARVESTER COMPANY

Something new...
made better
by aluminum



These 120-foot high-tension towers carry power across the 50 miles between Aluminium Limited's Kemano generating station and Kitimat smelter.

12-story aluminum towers carry world's largest high-tension cables

Across Canada's weather-wild Kildala Pass, aluminum is meeting a new challenge in structural design. These giant towers withstand tons of snow and wind pressure . . . support half-mile spans of ice-laden cable. Yet they were delivered by helicopter in prefabricated sections for quick assembly on the spot.

Aluminum a Natural

Aluminum was a natural for this job, since its properties match the specifications for strength, weatherproofness, light weight and easy assembly. Comparable steel towers would be 65% heavier and require 2½ times the man-hours to assemble.

Easily Fabricated

Created and engineered by Aluminium Limited, these towers also show how easily aluminum is fabricated. The tubular leg sections are formed in diameters to 38" by welding semicircular halves of rolled sheet. Crossarms are box girders up to 76 feet long, assembled with aluminum rivets.

New Fabricator Markets

With this knowledge and experience, independent U. S. fabricators can look for more business in heavy structural applications. To assure a dependable supply of primary metal for these future needs, Aluminium Limited is investing $3,000,000 a week in production facilities. Research, development and technical assistance programs are also expanding to further advance aluminum's position as the world's fastest growing metal.

Supplying U. S. industries with primary aluminum from Canada

Aluminium Limited *Sales, Inc.*

630 FIFTH AVENUE · NEW YORK 20, N. Y.

CLEVELAND · CHICAGO · DETROIT · LOS ANGELES · BUENOS AIRES · SÃO PAULO

New Advanced Features Make AO Ultrascopic Safety Glasses A Better Buy Than Ever

When we introduced American Optical Ultrascopic Safety Glasses, we intended them to be the finest, most advanced eye protection equipment available. They were enthusiastically accepted by industry at all levels. A tremendous increase in eye protection sales attests to this success. They truly have been "a new dimension in eye protection."

However, in keeping with American Optical's policy of making good products even better, continual American Optical research and laboratory testing have developed many new improved features on American Optical Ultrascopic Safety Glasses. Now, with these advanced refinements, they are a better buy than ever.

New Wrap-Around Case No. 954 of Cordovan vinyl. Won't wrinkle, peel or crack.

American Optical Fits-On Goggles which protect Ultrascopic Safety Glasses from pitting and scratching.

1. The F9500 Series in copper bronze. This handsome styling will appeal to all and to women workers in particular.
2. The F9500 Series with clear transparent side shields, thus increasing side vision.
3. Spatula tip temples for the F5100 Series without side shields.
4. The F9500 acetate Series is available with metal screen side shields. The F5100 metal series is available with all plastic perforated side shields.
5. Both series are available with 6 curve Plastolite (plastic) lenses.
6. New case with pocket clip (No. C954) and without pocket clip (No. 954) has been developed to accommodate either the metal or acetate goggle without side shields.
7. New Ultrascopic Fits-On Goggles. These are designed to fit either the F5100 or the F9500 Series with or without side shields. Glass or plastic lenses. Glass lenses clear and Calobar ground and polished Meniscus. Plastic lenses, clear or green meniscus. Model 21W for metal safety glasses, model 22W for acetate. 42-44-46-48 mm. eye sizes.
8. Both the F5100 and F9500 series are available with "Balanced Vision" in R glasses. Workers who need correction are assured of balanced or "compensated" vision from lens edge to lens edge.

American Optical
COMPANY
SAFETY PRODUCTS DIVISION

Always insist on Trademarked Lenses and Frames. Your nearest American Optical Safety Products Representative can supply you.

SOUTHBRIDGE, MASS., BRANCHES IN PRINCIPAL CITIES

MAX-WEAR ALLOY

makes parts like these last longer

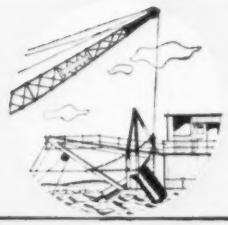
DREDGE BUCKET

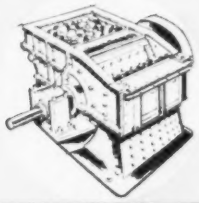
ROCK CRUSHER

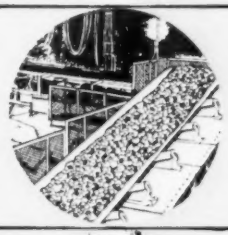
CHUTE LINING

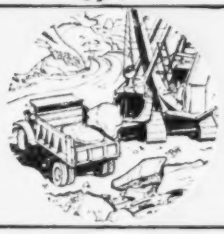
WEAR PLATE

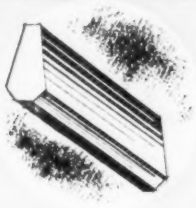
GROUSER BARS











—keeps equipment on the job

Max-Wear Alloy Steel (13% manganese, 2% nickel) is *work hardening!* This means the more it's used the harder the surface becomes (up to 500/550 BHN). But only the surface hardens; the interior of the steel is unaffected. As a result, Max-Wear parts have truly wear-resistant surfaces *plus* high strength and toughness internally.

When you make parts like those shown with Crucible Max-Wear, you reduce downtime, cut repair and replacement costs. For Max-Wear resists repeated heavy impacts and abrasion—just what you need on jobs where equipment takes a bad beating.

Crucible Max-Wear is especially practical for repairs in the field. It can be formed cold or at *red heat*, and is easily shear or torch cut and welded. No annealing is necessary after these operations—a big advantage in the field.

Max-Wear is now available in rounds, squares, plates and special grouser shapes. If you are looking for an easy-to-use alloy steel that will give you longer service under impact, wear and abrasion, try Crucible Max-Wear. *Crucible Steel Company of America, The Oliver Building, Mellon Square, Pittsburgh 22, Pa.*

See us at N.A.P.A. Inform-A-Show
Atlantic City, May 26-29
Booths 1, 2, 3, 4.

CRUCIBLE first name in special purpose steels

Crucible Steel Company of America

USERS SAY R/M BELTS AND HOSE GIVE YOU

Ray-Man Conveyor Belt... Lower Cost per Ton Carried

Cushioned strength members . . . with double compensation to relieve stress on outer plies . . . give Ray-Man Conveyor Belt unusual flexibility to permit fuller loads . . . even where relatively thick, narrow belts are used . . . or where pulleys are small. Holds fasteners under the most severe conditions. No breaker ply required. Use of newest synthetic super-strength fibers insures even greater service than ever before. Like all R/M heavy duty conveyor belts, Ray-Man is moisture resistant . . . mildew-proof . . . and protected against wear, tear, cuts and abrasions with R/M's exclusive and remarkably tough "XDC" Cover. Ray-Man cuts handling costs because it does a bigger job, better . . . and *lasts longer*.

Write for Bulletin #6915

● TRAINS NATURALLY

● RESISTS IMPACT

● DOUBLE COMPENSATION RELIEVES OUTER PLY STRESSES

Ask an R/M representative how these features of Ray-Man Conveyor Belt add up to lower cost per ton handled . . .

"More Use per Dollar"

"More Use per Dollar"

R/M Poly-V® Drive Delivers More Power in *Less Space!*

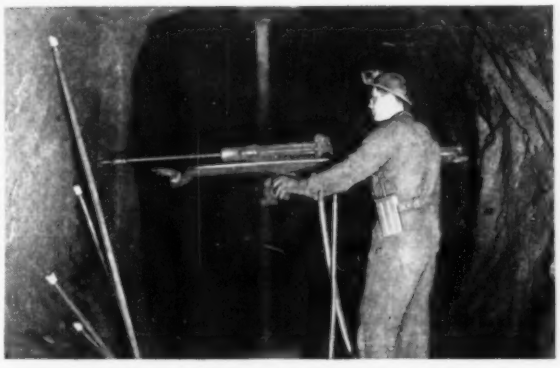
Unique patented design accounts for the extra power capacity of R/M Poly-V* Drive. A single, endless belt, with lengthwise parallel V-ribs running on sheaves designed to mate precisely with the belt ribs gives Poly-V high V-groove *grip* . . . *plus* flat belt *strength* . . . *twice* the tractive surface to deliver more power than ever before possible! Narrower sheaves can deliver *equal* power in as little as ⅔ the space required for a conventional V-belt drive . . . or up to 50% *more* power in the *same* space! This means *less* shaft overhang . . . *less* drive weight . . . *less* bearing load.

Poly-V eliminates multiple-belt "length matching" problems. Inventories of belts and sheaves are cut because just *two* belt cross sections meet every heavy-duty requirement.

Write for Bulletin #6638

And...for the "Smoothest Running V-BELTS Made," Specify CONDOR and R/M SUPER-POWER V-BELTS

*Poly-V is a registered Raybestos-Manhattan Trademark.



Homoflex Air Hose is Easy to Handle...Longer Lasting!

Bulk and stiffness are engineered *out* of Homoflex Hose . . . it's light, yet strong . . . "flexible as a rope" . . . *safe* for the toughest jobs! Homoflex Hose gets more work done . . . and it *lasts longer*. Get Bulletin #6879.

RM-701

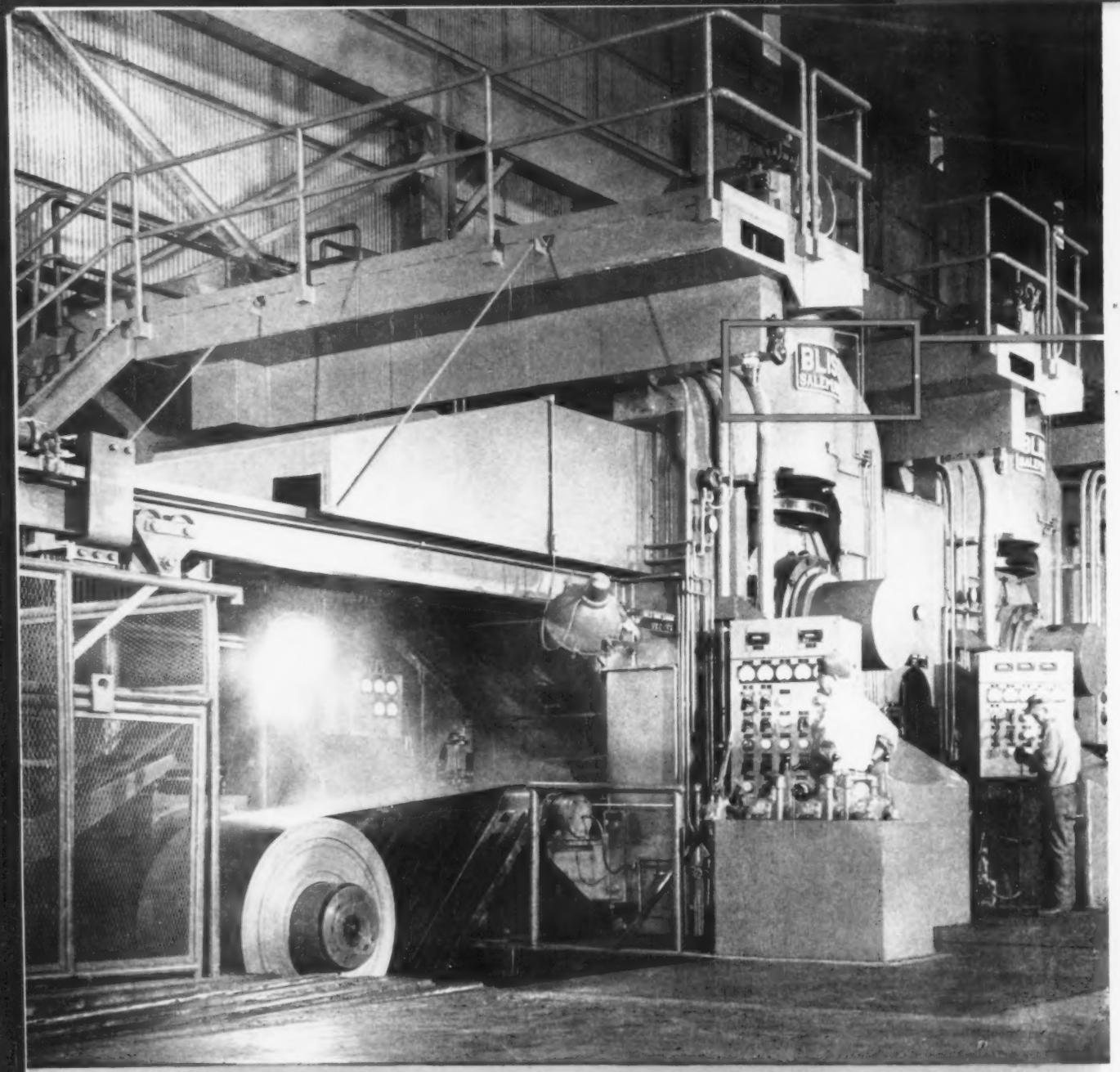
BELTS • HOSE • ROLL COVERING • TANK LININGS • INDUSTRIAL RUBBER SPECIALTIES

MANHATTAN RUBBER DIVISION—PASSAIC, NEW JERSEY

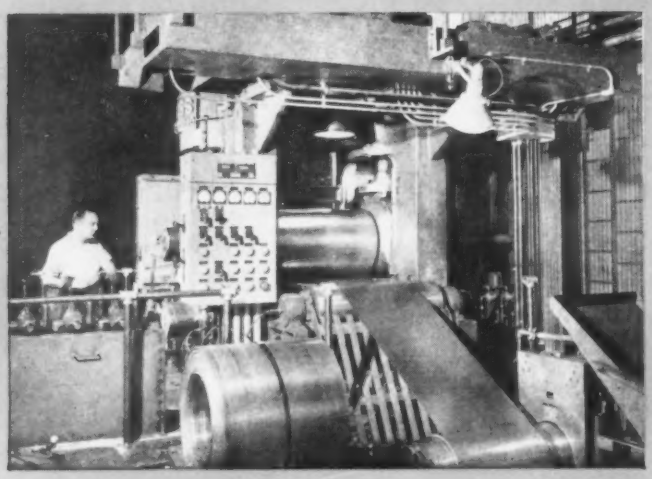
RAYBESTOS-MANHATTAN, INC.

Other R/M products: Abrasive and Diamond Wheels • Brake Blocks and Linings • Clutch Facings • Asbestos Textiles • Mechanical Packings • Engineered Plastics • Sintered Metal Products • Industrial Adhesives • Laundry Pads and Covers • Bowling Balls

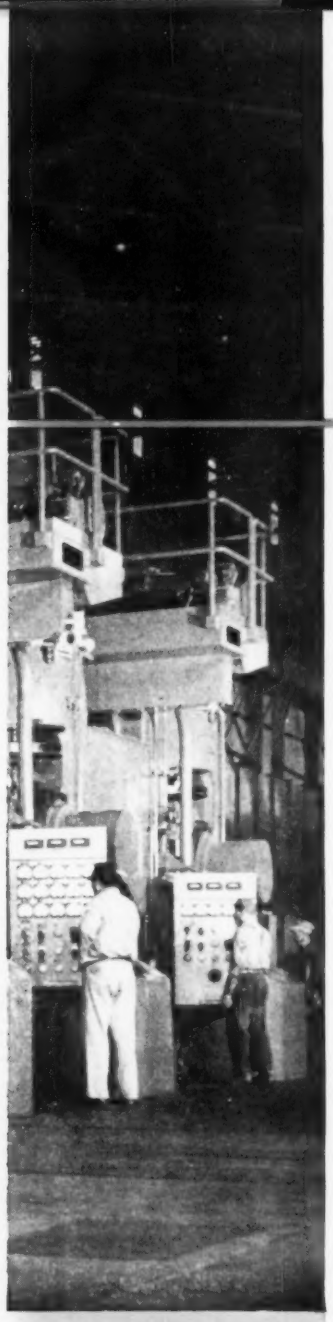
RM



New Bliss 4-stand tandem mill at Empire Steel. Each stand is a 19″ and 51″ by 52″ four-high mill. All entry and delivery equipment, including tension reel, coil buggy and belt wrapper were also made and installed by Bliss. Many of the rolls were supplied by Bliss' Mackintosh-Hemphill Division.



New Bliss 2-high 30″ x 50″ temper mill processes much of the output from the tandem. Its rated speed and coil capacity are the same as the big mill's.



Why Empire Steel picked BLISS mills for its new cold roll department...

Already known as a producer of hot rolled sheet and plate, Empire Steel Company, Mansfield, Ohio, has just completed a new cold roll department that ranks as one of the most up-to-the-minute in the country.

The key installation is a new Bliss four-stand tandem mill. Its 1866-feet-per-minute delivery speed on wide strip provides ample capacity for all Empire's foreseeable needs. A new Bliss single-stand two-high temper mill completes Empire's cold rolling facilities. Both mills are equipped with Bliss entry and delivery equipment capable of handling coils weighing up to 34,000 pounds.

Empire's selection of Bliss equipment was a logical one. Four years ago, Bliss engineered a complete hot strip mill for Empire, including the rebuilding of some existing equipment and the addition of completely new mills and accessories. The success of this modernization program had a strong influence on the company's decision to come to Bliss for its new cold rolling department.

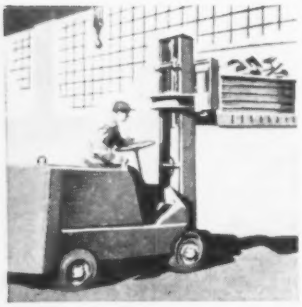
Whether you need a complete new mill or advice about modification to your existing facilities, it will pay you to discuss your problem with a Bliss engineer. To get acquainted, why not write for a free copy of our 60-page Rolling Mill Brochure, Bulletin 40-A.

BLISS
SINCE 1857

is more than a name . . . it's a guarantee

E. W. BLISS Company, General Office: Canton, Ohio
ROLLING MILL DIVISION: SALEM, OHIO

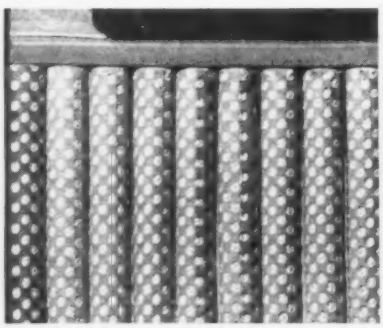
Plants at Canton, Cleveland, Salem and Toledo, Ohio; Detroit and Hastings, Michigan; Midland and Pittsburgh, Pennsylvania; San Jose, California. Representatives throughout the United States.



Get more work from your

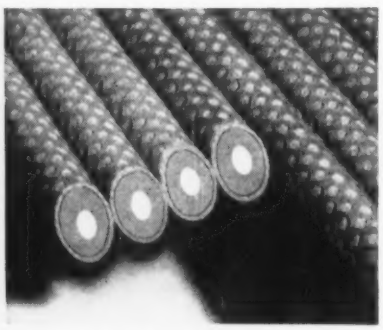
NEW TG EXIDE-

NEW POSITIVE AND NEGATIVE PLATES – DEVELOPED



New tubular construction of positive plate! Armored porous tubing. Provides resistance to corrosion and effects of vibration, improved flexibility, and maximum retention of active material. Thousands of tiny openings mean...

Greater porosity. Highly permeable tubes ease current flow, reduce internal resistance, improve access of electrolyte. Battery will deliver more power to meet sudden heavy loads. Tubes hold . . .



More active material. Chief source of battery power. Larger inside diameter of tubes means every positive plate contains more active material per cubic inch of plate. And for maximum capacity and long life, there's a . . .

electric industrial trucks

IRONCLAD BATTERY

Want more work hours—no increase in battery size? You get 44% more capacity in the new TG Exide-Ironclad Battery. For example, you can replace a 500 ah battery with a 720—in the same size. This means your trucks can do more work. They can earn a great deal more on your investment in them.

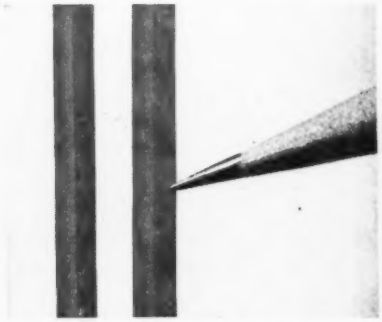
Satisfied with the work capacity of your present battery? Then get it at the lowest cost to own and operate—and get the newest, most advanced electric industrial truck on the market today.

Packs 44% more power into same battery space . . . priced to give you even greater battery economy

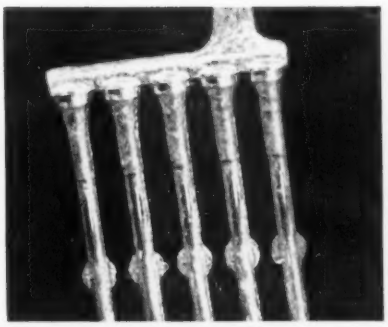
Want even lower operating cost and improved performance from your electric industrial trucks? Here Exide makes it possible. The new TG Exide-Ironclad Battery combines challenging new materials with an ingenious overall new design to produce the highest capacity per cubic inch of any battery available today. It's the most dramatic increase in capacity and the biggest step forward in power per dollar in history. This new battery can benefit every user of electric industrial trucks.

Learn more about the operating and expense advantages. Call your nearby regional Exide representative. Or write for complete information. Exide Industrial Division, The Electric Storage Battery Company, Philadelphia 1, Pa.

OUT OF RESEARCH STARTED 15 YEARS AGO



Thicker negative plate. Specially designed to match the increased capacity of the new positive plates. Plate is both thicker and stronger and possesses better electrical characteristics. You get all these advantages . . .



Plus Silvium,* Exide's exclusive grid alloy—proved more corrosion resistant than other leading grid alloys. Silvium is a patented combination of metals designed to prolong battery life. **U.S. patent*

Exide®

The Electric Storage Battery Company

How SKF Saved in 7 Ways

and at the same time improved its roller bearing cages by using the right

Revere Brass Strip

SKF Industries, Inc., Philadelphia, Pa., like other progressive organizations, is constantly seeking new ways to improve its products and at the same time cut production costs.

With this in mind they recently reviewed the kind of brass which was being used in their spherical roller bearing cages from the standpoints of quality and fabrication. It was then that Revere's Technical Advisory Service studied the problem first-hand and made recommendations to the **SKF** production and engineering departments.

SKF IMPROVED TYPE "C" Spherical Roller Bearing cut away to show how the cage, made of Revere Brass Strip, fits into the bearing. Due to its advanced internal design, this bearing provides greatly increased capacity and service life.

HERE IS "window-type" cage of **SKF** Spherical Roller Bearing, made in two pieces, one for each row of rollers. Cage is made from rugged Revere Brass Strip at the Shippensburg, Pa., plant of **SKF** Industries, Inc.

The result was the adoption of specification changes in brass strip as recommended by Revere which gave **SKF** these 7 money, time and tool-saving advantages:

1. One bore pressing operation has been eliminated. Machining is more easily accomplished. Less machining is required.
2. Tool life has been increased with some speeds increased up to 100% and feeds up to 30%.
3. Rework due to burrs has been greatly reduced. One step less is required in the deburring operation while savings through reduced cycle time for remaining deburring operations are up to 40%.
4. Chips are small now . . . there is no "angel hair" to clutter work area.
5. Life of punch used in notching roller bearing cage has been doubled. Now a run may be completed without making tool adjustments due to sharpening tools.
6. Machining speeds and feeds have been substantially increased over those in machining the former alloy.
7. Die setters report that considerable work has been eliminated in setting up the tools used.

And, all of these money-saving things were accomplished without sacrificing quality—in fact the quality of these roller bearing cages was *improved!*

This is still another eye-opening example of Revere supplying the metal that will do the best job and with the greatest economy . . . be it brass, copper or aluminum or any one of their alloys.

Why not call in Revere's Technical Advisory Service to review your operation? It may mean money saved with an improved product to boot.

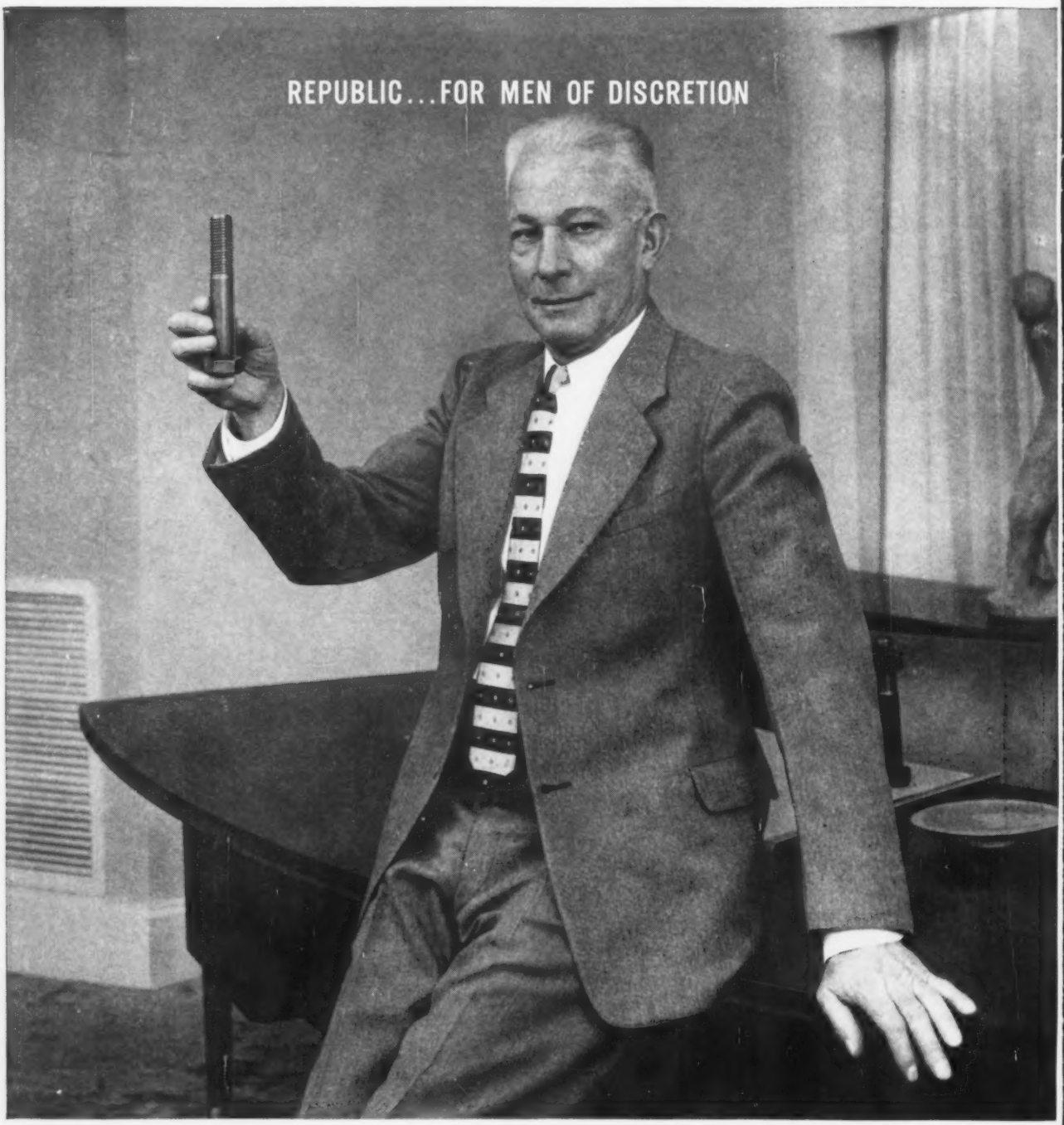
REVERE COPPER AND BRASS INCORPORATED

Founded by Paul Revere in 1801

230 Park Avenue, New York 17, N.Y.

Mills: Baltimore, Md.; Brooklyn, N.Y.; Chicago, Clinton and Joliet, Ill.; Detroit, Mich.; Los Angeles and Riverside, Calif.; New Bedford, Mass.; Newport, Ark.; Rome, N. Y. Sales Offices in Principal Cities, Distributors Everywhere.

COPPER • BRASS • 1801 • REVERE • ALUMINUM



(with a bow to LORD CALVERT)

REPUBLIC

REPUBLIC STEEL

World's Widest Range of Standard Steels

For Unsurpassed Excellence Every Time ...Specify Republic Fasteners

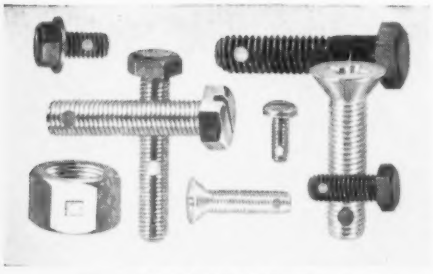
Fasteners are such a small part of final assembly cost, it pays to specify the best. Anything less can waste all of the money, time and material required to produce a quality product.

That's why it's a matter of discretion to specify Republic Fasteners. You can count on uniform excellence every time, because Republic is in complete control of every manufacturing step, from raw ore to finished product.

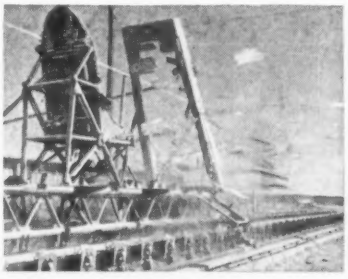
This single-standard quality control is applied to over 50 different analyses of alloy and carbon steels used in Republic Bolts and Nuts. Each is the best available for the ultimate use of the fasteners it will form.

You are assured of the very finest headed and threaded products that modern materials, methods and technology can produce.

So don't just order fasteners, *select* Republic and be sure of the best. Your local Republic representative or distributor can help you determine the type or types best suited to your needs. Over 20,000 standard and 8,000 special types and sizes are available to meet practically any requirement. For complete information, mail coupon.



UNSURPASSED LOCKING POWER, seated or not, is only one of the advantages of Republic Nylok® Bolts and Nuts. In addition, the resilient nylon insert permanently imbedded in the fastener provides re-usability, eliminates the lost motion of assembling extra locking devices and permits either hand or power wrenching. Send coupon for full details.



DESIGN EXCELLENCE of your tubular products is underwritten by quality material when you specify Republic ELECTRUNITE® Mechanical Tubing. Its uniform strength, ductility and concentricity make forming, bending and welding operations easy. Further, ELECTRUNITE's high strength-to-weight ratio adds rigidity to any assembly without excess weight.

UNSURPASSED EFFICIENCY in materials handling operations often depends on special equipment. To get what you need, contact Republic's Pressed Steel Division representative for all of your skid, pallet, box, and racking needs. In addition to a complete line of standard units, Republic can engineer special designs for single or multi-purpose use.

STEEL

and Steel Products

REPUBLIC STEEL CORPORATION
Dept. C-3425
3104 East 45th Street
Cleveland 27, Ohio

Please send me more information on:

☐ Fastener Products ☐ Nylok Fasteners
☐ ELECTRUNITE Mechanical Tubing
☐ Materials Handling Equipment

Name_____ Title_____

Company_____

Address_____

City_____ Zone____ State_____

✓ happy balance between dependable performance and moderate cost

ROLLWAY STEEL CAGE ROLLER BEARINGS

Tru-Rol *precision, steel-cage, heavy-duty bearing with contoured guide lips assuring true right-line rolling, maintained roller alignment and thin oil film.*

● Rollway's *TRU-ROL* Steel-Cage Bearings afford wide latitude in balancing *dependable* performance, *long* life, and *high load* capacity against *moderate* cost. They rate high in any comparison on a cost-performance basis.

A choice of stamped steel retainers with contoured guide lips, or steel segmented retainers assure true rolling and an evenly distributed *thin* oil film — *big factors in reducing power losses and heating.*

"Crowned" Rollers Relieve End Stress

TRU-ROL offers the extra advantage of a finish-ground "crown" radius on the roller ends. That relieves high end-stress and insures uniform load distribution over the entire length of the roller. The result: *TRU-ROL* Steel Cage Bearings carry heavier loads over longer periods without excessive end-fatigue. They are less affected by slight misalignment or shaft deflection.

Investigate *TRU-ROL* Steel Cage Roller Bearings before selecting any bearing in the medium price range.

TYPE D

Rollway Metric Series Steel Cage Roller Bearings

● Rollway Metric Series Steel-Cage Bearings offer the greater load capacity of solid cylindrical rollers, plus the true right-line rolling of trunnion rollers turning in a rigid steel cage. There's no roller skew, no pinch out, no cam action. Design permits maximum bearing capacity . . . within small space . . . at moderate cost.

Let Rollway Help...

Our complete engineering and metallurgical services will gladly work with you on your problem. Simply write or wire any sales office. No cost. No obligation.

Rollway Bearing replacements are available through authorized distributors in principal cities. Consult your classified phone directory.

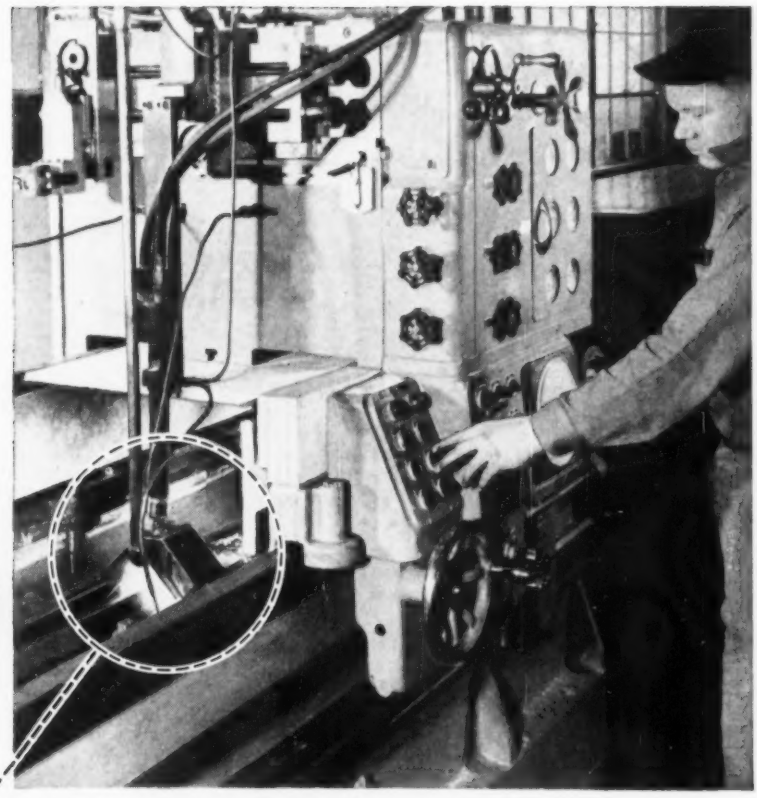
ROLLWAY BEARINGS

COMPLETE LINE OF RADIAL AND THRUST CYLINDRICAL ROLLER BEARINGS

ROLLWAY BEARING CO., INC. SYRACUSE, N.Y.
584 SEYMOUR STREET

ENGINEERING OFFICES: Syracuse • Boston • Chicago • Detroit • Toronto • Pittsburgh • Cleveland • Milwaukee • Seattle • Houston • Philadelphia • Los Angeles • San Francisco

HIGH SPEED FLAME-HARDENING



Cross-section view shows uniform depth of hardened surface.

SPECIAL MACHINE UPS LIFE OF GRAPHITIC STEEL PARTS

LINDE engineers have assisted Cincinnati Steel Treating Company in developing a flame hardening machine which increases service life of 16 ft. long, graphitic carbon steel lathe ways . . . Development of this automatic, high speed machine is another example of how LINDE Service Engineers are helping LINDE's customers up production speed and unit quality through co-operative research engineering.

With this new machine, a lathe way to be treated is placed on a magnetic chuck in a water filled channel. Flame-hardening heads and control mechanism move at predetermined speeds along the part. After it cools, the lathe way is placed in a refrigerator for 24 hours which stabilizes the steel, and brings its case hardness to a minimum of 60 Rockwell "C" scale.

The benefits of LINDE's research, engineering, and over 40 years of accumulated know-how stand behind each of its customers to help them solve production problems. Get these "plus-values" which LINDE offers—it pays you to do business with LINDE.

Linde Air Products Company
A Division of Union Carbide and Carbon Corporation
30 East 42nd Street UCC New York 17, N. Y.
Offices in Other Principal Cities
In Canada: LINDE AIR PRODUCTS COMPANY
Division of Union Carbide Canada Limited, Toronto

Linde Trade-Mark

The term "Linde" is a registered trade-mark of Union Carbide and Carbon Corporation.

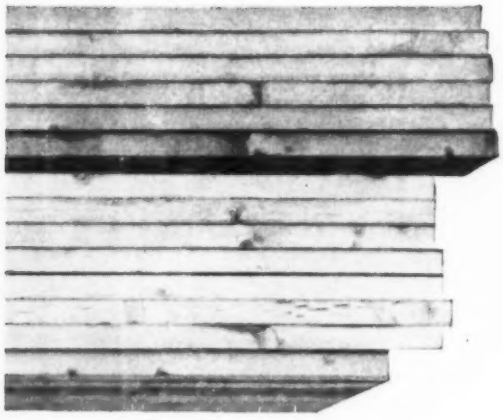
To meet the need of expanding industries for better materials handling methods, look to Yale for advances in research, engineering, manufacturing, sales and service—as YALE BUILDS FOR THE NEW ERA

Now...first and

Handles 15,000 to 20,000 lb. Loads of Lumber or FABRICATED METALS

New Yale High-Capacity Gas Trucks handle extra-heavy loads with maximum speed, safety and efficiency—in both indoor and outdoor operations.

only high-capacity gas truck with full visibility



WIDE-ANGLE VISION

300% MORE VISIBILITY THAN ANY OTHER TRUCK OF ITS TYPE! Not just straight-ahead vision—but "corner of the eyes" vision, too—*fully functional* visibility with the big, open look of new Yale High-Capacity Gas Trucks. Operator sits high and in center. Upright channels are wide-spaced, nested to reduce frontal obstruction. Right next to them—the hoisting cylinders, one right, one left. Chains that raise carriage are in front of cylinders—*out* of the arc of vision.

Carriage has one top bar, one bottom bar—good visibility between them at all levels of fork lift. Channel cross members are at channel ends—none between. When an attachment is used, hydraulic hoses are located in front and behind cylinders—not in the line of sight. Whether looking forward or to the rear, the operator sees more. Result: these new Yale trucks with "Wide-Angle Vision" promote safer, faster, more efficient handling of 15,000 to 20,000 lb. loads.

GREATER STABILITY. Lifting, lowering, traveling—these Yale trucks keep capacity loads in precision balance! Minimum weaving with full loads, because the trucks are built low—low center of gravity, with high underclearance. Extremely rugged design. Broad lifting base afforded by two ball-mounted lift cylinders. Wide channel-roller spacing at all points of lift, plus side-thrust rollers on channels and carriage, further increase stability factor. Large-size, high-flotation tires give good traction under severest terrain conditions.

FAST CYCLE OPERATION. New Yale High-Capacity Gas Trucks have lifting speeds up to 60 feet per minute; fast, safe lowering; travel speeds up to 20 miles per hour; easy maneuverability.

TOP PERFORMANCE UNDER TOUGHEST CONDITIONS

Here are just a few of the premium engineering features—all included as *standard*—that give new Yale Gas Trucks a big edge in stamina and safety under all conditions:

- I-beam side members in frame for extra strength.
- Channels mounted on ball-bearing rollers to reduce friction and wear.
- Ball-mounted, self-aligning hoisting cylinders.
- Gear shift lever, plus hoist, tilt and attachment lever at right side of driver. Directional control lever conveniently located on steering column.
- Power steer with two balanced hydraulic cylinders, one to each rear wheel, to reduce stress on bearing points and linkage.
- Your choice of Yale Fluid Coupling or standard transmission.

Designed for complete selection of attachments—engineered for a minimum loss distance.

YALE*

*REG. U. S. PAT. OFF.

INDUSTRIAL LIFT TRUCKS AND HOISTS

YALE & TOWNE

The Yale & Towne Mfg. Co., Materials Handling Div. Manufacturing Plants in Philadelphia, Pa., and San Leandro, California

The YALE & TOWNE Manufacturing Co., Dept. A-945
Roosevelt Blvd., Philadelphia 15, Pa.

Please send the new Yale High-Capacity Gas Truck brochure No. 5230.

Name_____ Title_____

Company_____

Address_____

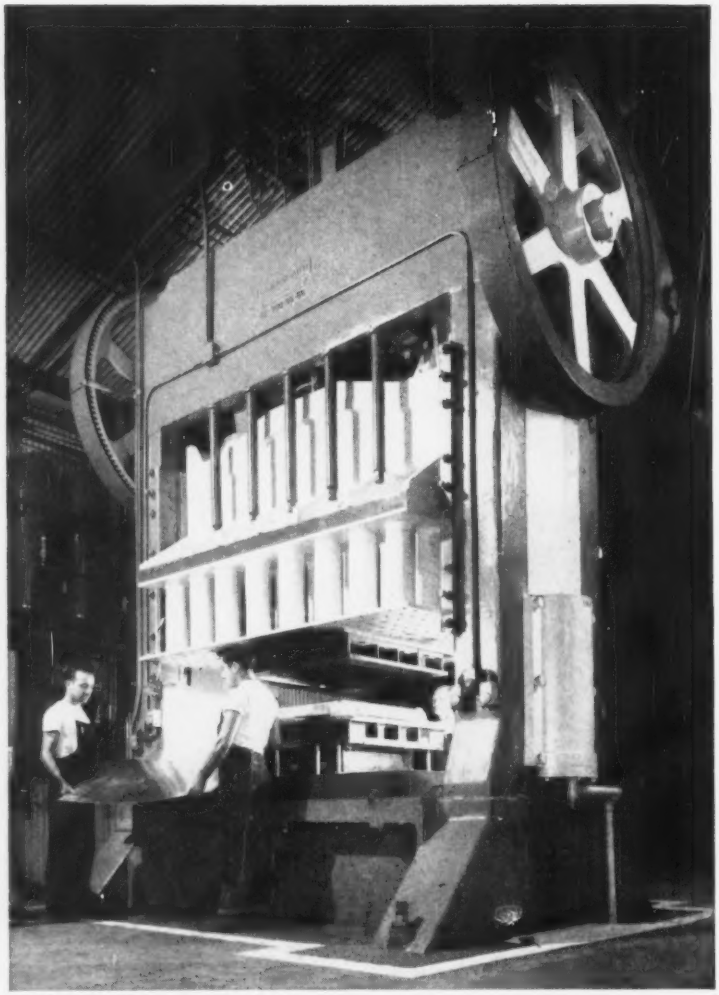
City_____ Zone___ State_____

In Canada: write The Yale & Towne Manufacturing Co., St. Catherines, Ontario, Canada

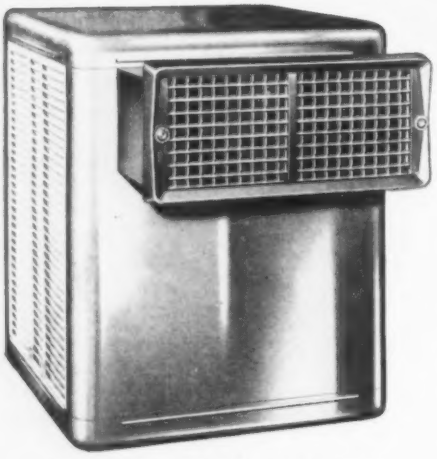
Gasoline, Electric & LP-Gas Industrial Lift Trucks • *Worksavers* • Warehousers • Hand Trucks • Hand and Electric Hoists

Cleveland Press speeds production at International Metal Products Company

famous **arctic circle**
air cooler parts completely formed
in just one stroke!



Cleveland Straight Sided Double Crank Press, 300 ton capacity, two 25 ton air cushions.



Cabinet fronts and grills for this famous
arctic circle
air cooler are formed in a single stroke.

"This Cleveland Press is one of our more versatile pieces of equipment. We do the greatest portion of our deep draw work on this press. The large bed area permits us to mount as many as four dies; thus we draw, blank, punch and form cabinet fronts and grills in a single stroke. We also use it for large blanking and multiple forming operations".

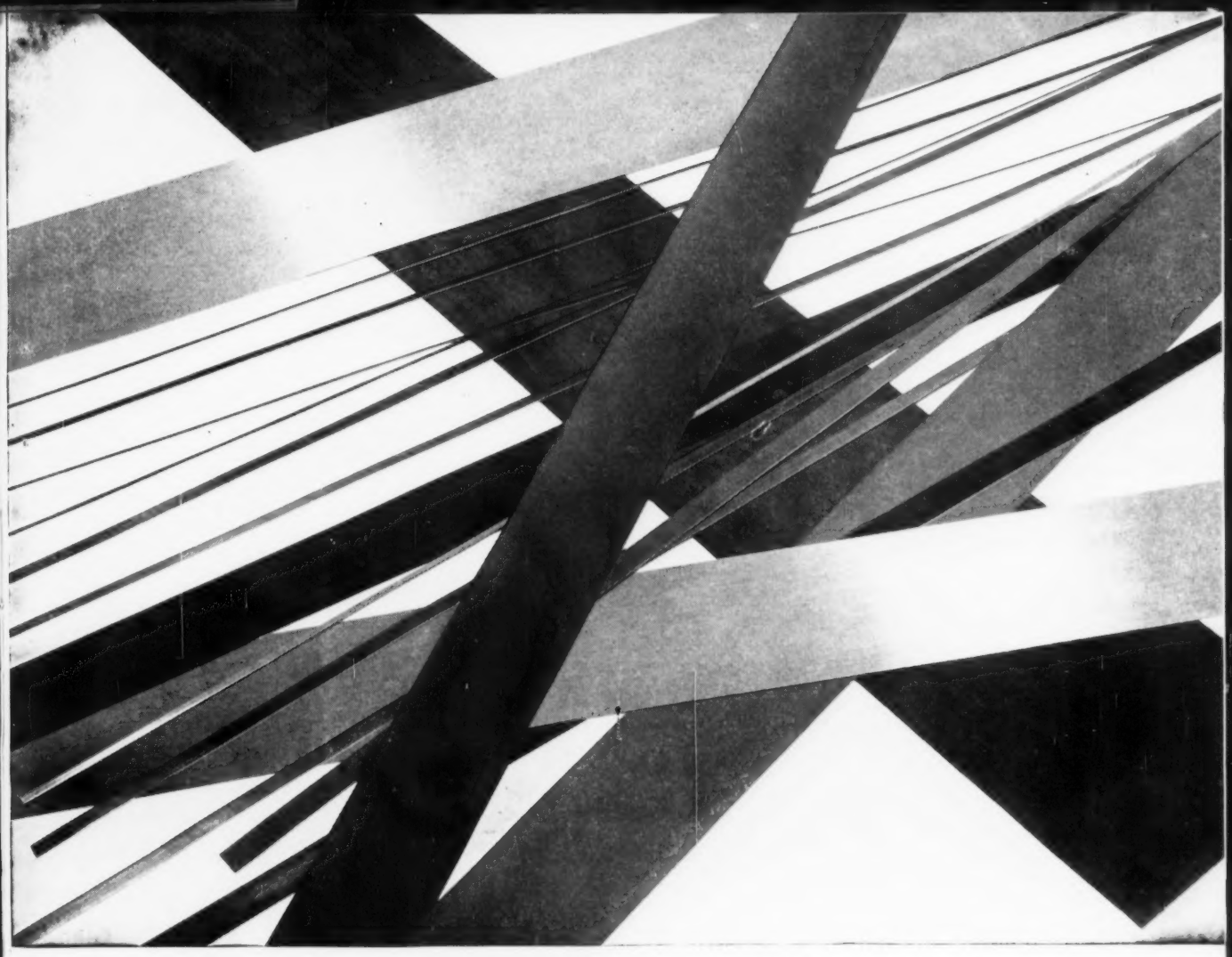
G. J. Rice, plant engineer at International Metal Products Co. of Phoenix, concluded his recent letter by stating,

"*Clutch performance has been outstanding.* Other than normal adjustments there has been very little maintenance required on this press".

You, like many other leading manufacturers, will find many advantages in new Cleveland Presses. There are 11 types in a wide range of sizes. One of these will exactly meet your requirements . . . will assure lower stamping costs, faster production. A Cleveland engineer will gladly advise you for most advantageous selection. Just write or call today!

The CLEVELAND Punch & Shear Works Co.
Power Presses • Fabricating Tools • Punching Tools and Dies
East 40th and St. Clair Avenue, Cleveland 14, Ohio
Offices at: New York • Chicago • Detroit • Philadelphia • East Lansing • Cincinnati

THE CLEVELAND PUNCH & SHEAR WORKS CO.
Established 1880



How these "educated" steels make products behave better

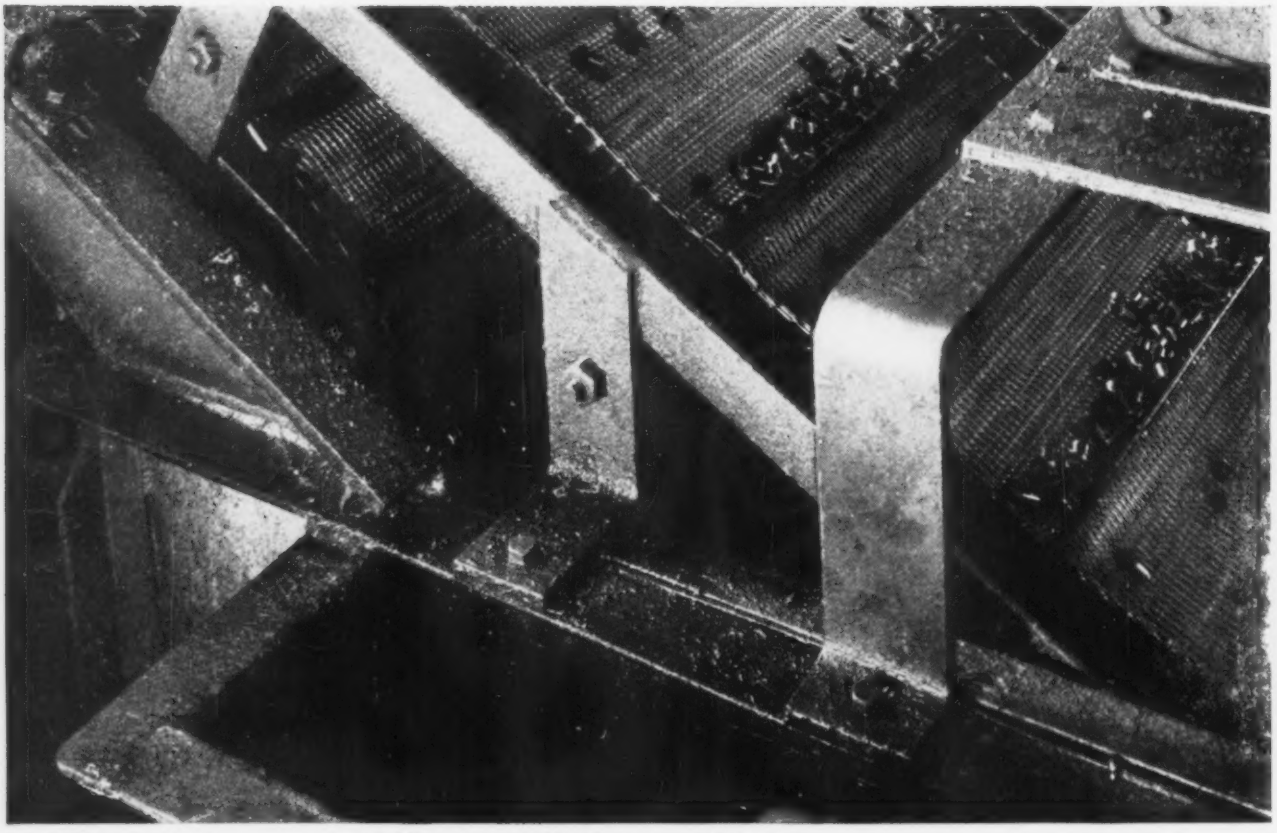
● Nobody will deny that there can be a vast difference between steels that are supposedly alike. The difference lies in "tremendous trifles" that often make all the difference between smooth and erratic fabrication or between satisfactory and faulty product behavior.

That's why the steels shown above are "educated", you might say—educated for special use. Because here at the *Athenia Steel Division* of National-Standard we've concentrated for years on learning about and *controlling* those tremendous trifles! In turn, this learning and experience is put right into the Athenia steels that successfully meet many of the toughest assignments known today.

If your production calls for cold rolled flat steels of .45 carbon or higher, from .015" to 16" wide and from .001" to .065" thick, it would be a good idea to explore Athenia quality, performance and service.

NATIONAL NS NATIONAL-STANDARD Company **STANDARD**

DIVISIONS: NATIONAL-STANDARD, Niles, Mich., *tire wire, stainless, music spring and plated wires* • WORCESTER WIRE WORKS, Worcester, Mass., *high and low carbon specialty wires* • WAGNER LITHO MACHINERY, Secaucus, N. J., *metal decorating equipment* • ATHENIA STEEL, Clifton, N. J., *flat high carbon spring steels* • REYNOLDS WIRE, Dixon, Ill., *industrial wire cloth*

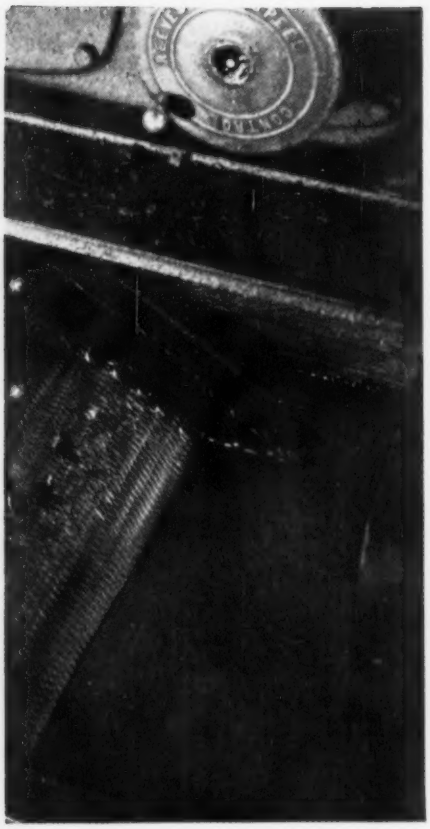


Gulf Super-Quench possesses remarkable service stability—One reason why it's the high-speed quenching oil used by Lindberg for the past ten years.

Batch elevator type atmosphere furnace used by Lindberg for clean neutral hardening, gas carburizing and carbo-nitriding. Super-Quench is a "must" on low carbon stampings and screw machine parts.

why GULF fast quenching oil

Here's why in the words of Norman O. Kates, Chief Metallurgist of Lindberg: "We appreciate Super-Quench's versatility to effectively harden parts of varying cross sections made of low hardenability steels. A 12,000 gallon central storage system pumps Super-Quench to various tanks throughout the plant. Diverse products such as production stampings, shafts, gears, jigs and fixtures are quenched to uniform hardness with minimum distortion."



Here Super-Quench effectively hardens pieces of low hardenability steel with a minimum of distortion.
Tom Corcoran, Lindberg Plant Superintendent, and V. O. Chase, Gulf Sales Engineer, inspect extension sockets coming out of Super-Quench, after going through a continuous atmosphere controlled furnace.

SUPER-QUENCH is the

used by Lindberg Steel Treating Company

Melrose Park, Ill.

Super-Quench offers you higher initial quenching speed than conventional quenching oils. It achieves deeper, more uniform hardening of many types of steel and produces less distortion in pieces of varied sections and shapes.

Look into *all* the advantages of Gulf Super-Quench. Contact your nearest Gulf office and ask for a Gulf Sales Engineer to call. Or send the coupon for free booklet.

GULF OIL CORPORATION IA
1822 Gulf Building, Pittsburgh 30, Pa.
Please send me, without obligation, a copy of your 24-page booklet on the uses and advantages of Gulf Super-Quench.

Name _____ Title _____
Company _____
Address _____
City _____ Zone _____ State _____

GULF

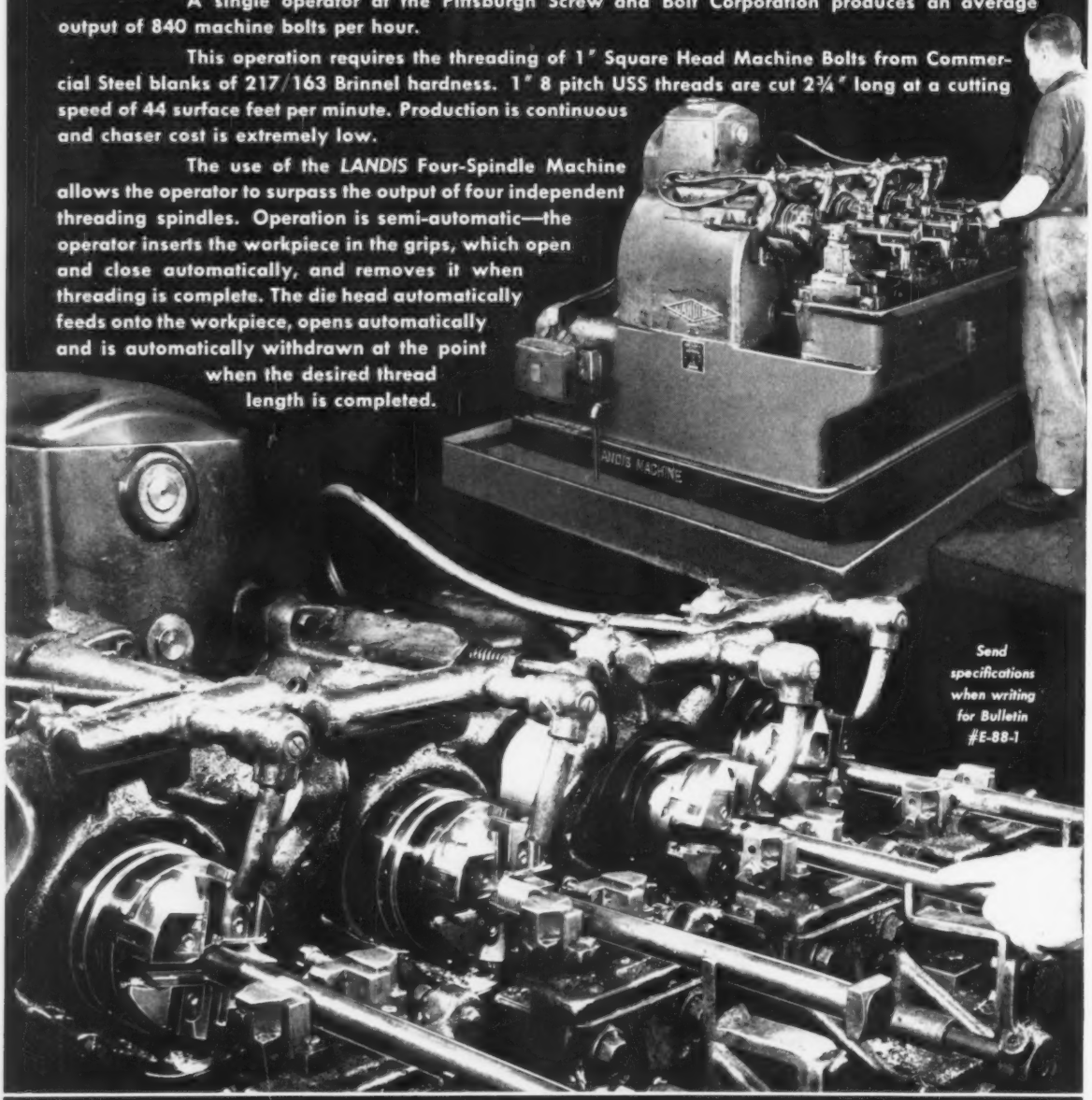
THE FINEST PETROLEUM PRODUCTS FOR ALL YOUR NEEDS

One Machine Bolt Threaded Every 4⅓ Seconds... WITH THE LANDIS 4-SPINDLE SEMI-AUTOMATIC THREADER

A single operator at the Pittsburgh Screw and Bolt Corporation produces an average output of 840 machine bolts per hour.

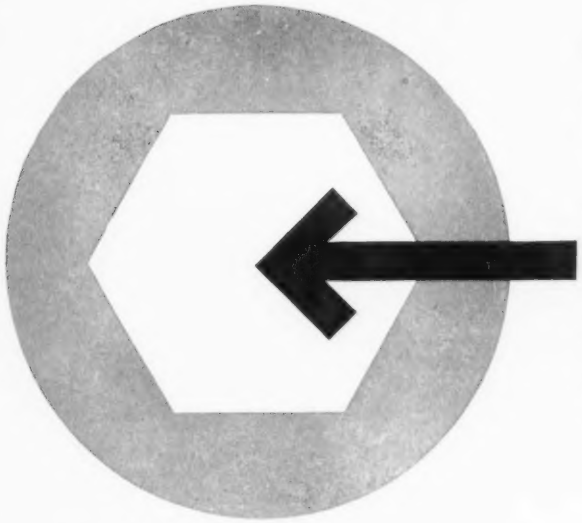
This operation requires the threading of 1" Square Head Machine Bolts from Commercial Steel blanks of 217/163 Brinnel hardness. 1" 8 pitch USS threads are cut 2¾" long at a cutting speed of 44 surface feet per minute. Production is continuous and chaser cost is extremely low.

The use of the *LANDIS* Four-Spindle Machine allows the operator to surpass the output of four independent threading spindles. Operation is semi-automatic—the operator inserts the workpiece in the grips, which open and close automatically, and removes it when threading is complete. The die head automatically feeds onto the workpiece, opens automatically and is automatically withdrawn at the point when the desired thread length is completed.



Send specifications when writing for Bulletin #E-88-1

LANDIS *Machine* COMPANY · WAYNESBORO PENNSYLVANIA



STRAIGHT FACTS ABOUT HOLO-KROME SOCKET SCREWS

30 seconds to separate fact from fancy!

FACT 1 Holo-Krome Socket Screws are far tougher than you might think. Their sockets easily withstand at least 50% more torque than can be exerted by a hex key in ordinary hand-tightening.

FACT 2 Power tool tightening is different. Then tightening force depends on the torque of the driving tool, strength of the bit, and the inherent toughness of the socket. H-K sockets are guaranteed to give unfailing performance.

FACT 3 Holo-Krome sockets have sharp hex corners, untapered socket walls, socket depth scientifically proportioned, continuous metal fibers reinforcing the socket wall.

Your best insurance against socket screw failure is H-K's exclusive forging method. For the toughest in socket screws—and hex keys—look to Holo-Krome!

HOLO-KROME

THE HOLO-KROME SCREW CORP., HARTFORD 10, CONN.

Sold only through authorized Holo-Krome distributors.

take advantage of Claymont's

If you have to turn down jobs because you don't have the right equipment . . . if you have equipment that's only being used part time . . . if you take "profit-killing" jobs to be of service to your customers . . . if you're interested in a new and easier way to handle difficult fabricating jobs . . . **it'll pay you to get the story on Claymont's Fabricating Service.**

You see, Claymont maintains a modern, fully-equipped machine and fabricating shop as part of its extensive steel mill operations. A shop that specializes in both difficult and mass-production operations.

What does this mean to you? It means that, before the steel ever leaves the mill, Claymont can perform the fabricating operations you don't want to handle. This eliminates needless scrap . . . stops freight, storage and handling costs on metal you can't use . . . enables you to make better use of your capital by reducing your needs for seldom-used patterns and equipment . . . and assures you of a constant steel supply from Claymont's widespread producing facilities.

For further details, contact your nearby CF&I representative or write today to Wickwire Spencer Steel Division, The Colorado Fuel and Iron Corporation, P. O. Box 1951, Wilmington, Delaware.

An overall view of Claymont's new, enlarged Fabricating Shop. It occupies over 100,000 square feet of floor space.

CF&I

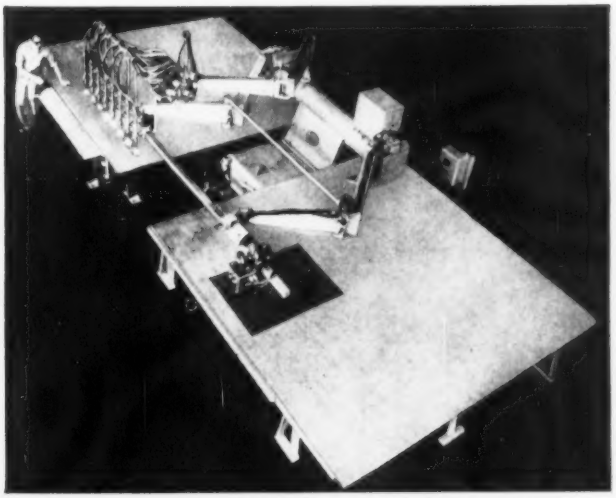
Claymont Steel Products

Products of Wickwire Spencer Steel Division • The Colorado Fuel and Iron Corporation

Albuquerque • Amarillo • Atlanta • Billings • Boise • Boston • Buffalo • Butte • Casper • Chicago • Denver • Detroit • El Paso • Ft. Worth • Houston • Lincoln
Los Angeles • New Orleans • New York • Oakland • Odessa • Oklahoma City • Philadelphia • Phoenix • Portland (Ore.) • Pueblo • Salt Lake City • San Francisco
Seattle • Spokane • Tulsa • Wichita • CF&I OFFICES IN CANADA: Toronto • Montreal • CANADIAN REPRESENTATIVES AT: Calgary • Edmonton • Vancouver • Winnipeg

4258

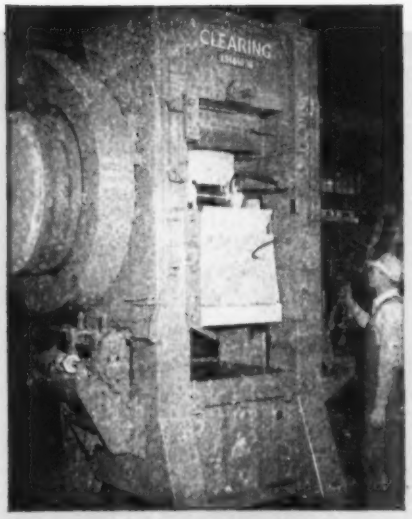
steel fabricating service



One of Claymont's multi-torch travographs which are used to produce a wide variety of flame-cut steel plate shapes.

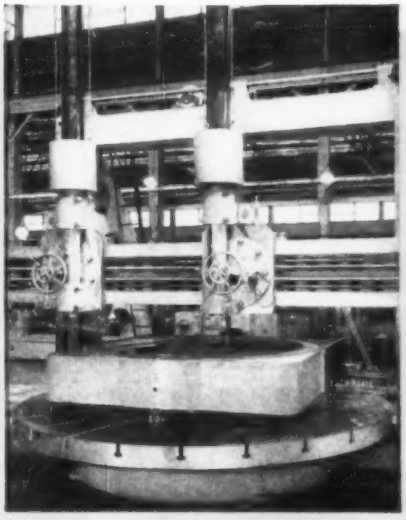
Can you use this Claymont machinery?

Multi-torch Travographs
Radiographs
Special Edge Preparation Burning Equipment
Heavy Duty Shears
Bending Roll
Press Brake
Mechanical Presses
Vertical Punching Equipment
Vertical Boring Mill
Radial Drills
Vertical Milling Equipment
Surface Grinding Equipment
Do-ALL Saw
Horizontal Turning Equipment

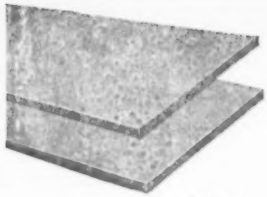


← Claymont's new shop is equipped with several mechanical presses, including this one having a 400-ton capacity.

This 16-foot vertical → boring mill enables Claymont to perform operations which are impractical for the average fabricating plant.



OTHER CLAYMONT PRODUCTS



Steel Plates

Alloy • High Strength Low Alloy
Stainless-Clad • Nickel Plated

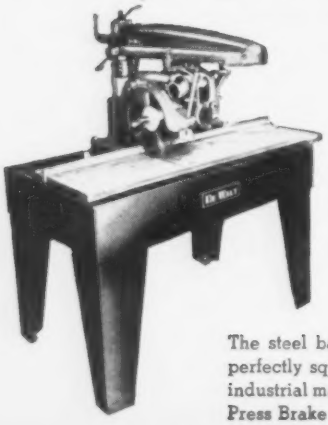
Flanged and Dished Heads

Manhole Fittings and Covers

4258

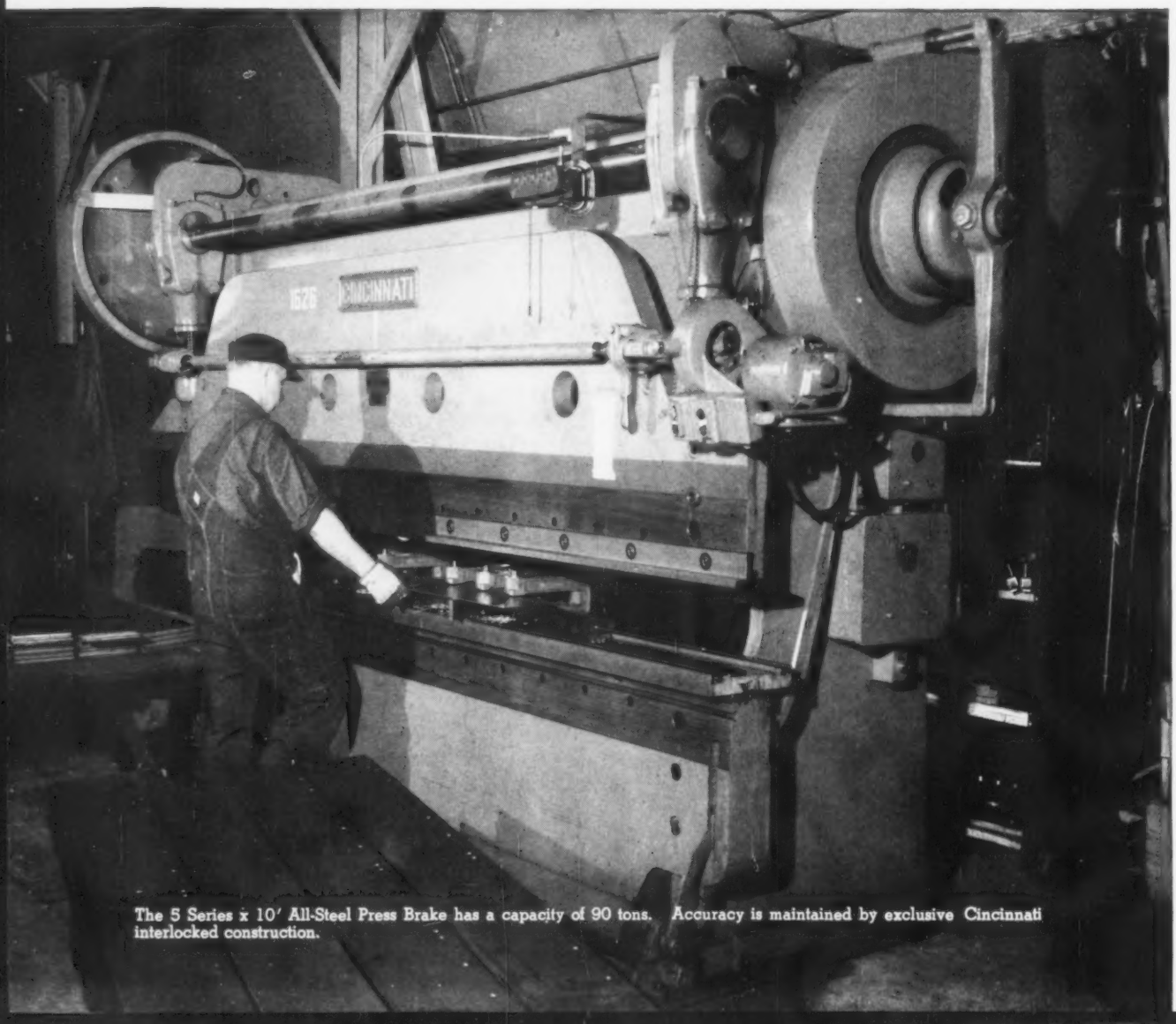
Large Diameter Welded Steel Pipe

1/3 cost reduction combined with product improvement...by use of Cincinnati Shear and Press Brake

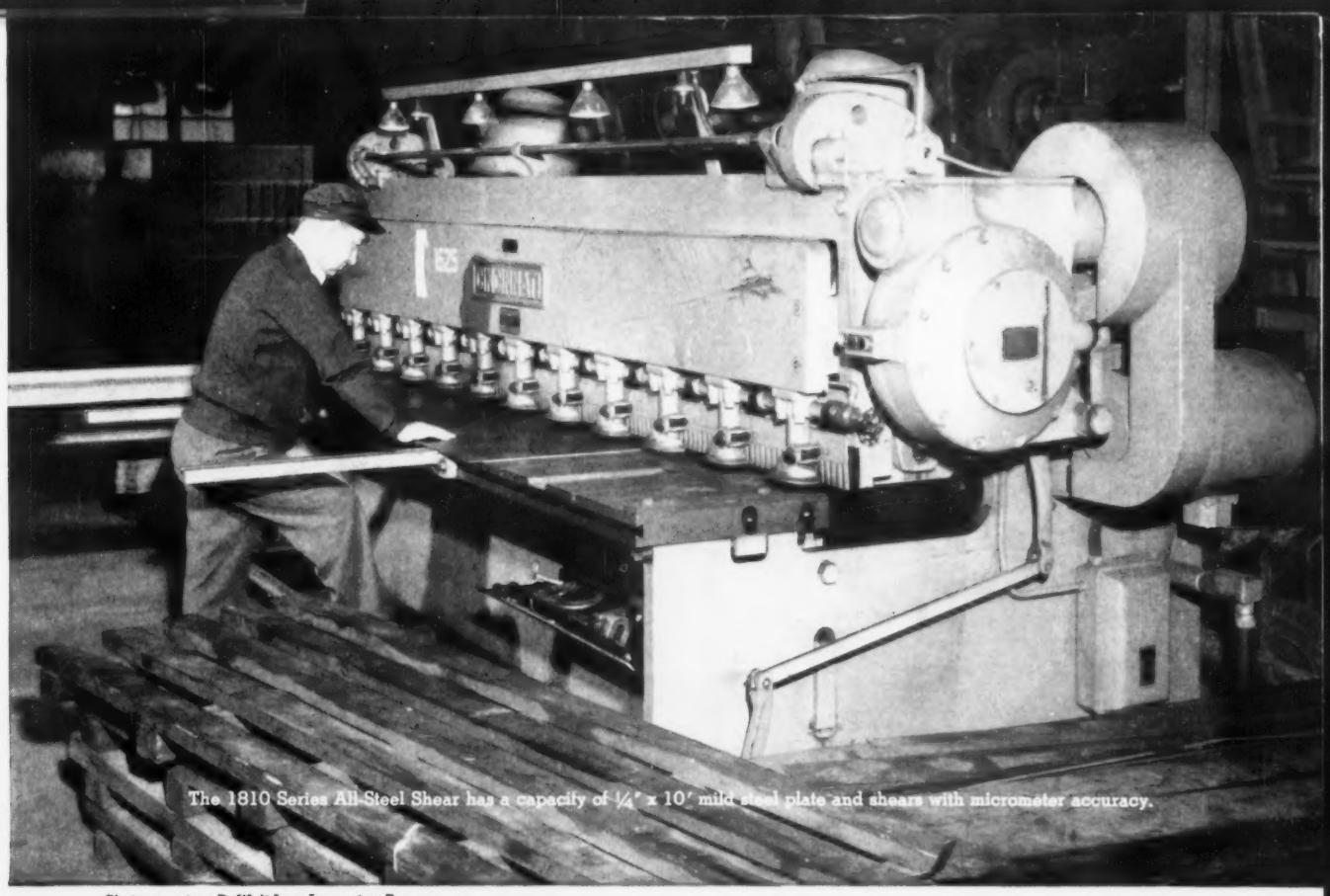


...at **DE WALT INC.** Lancaster, Penn.

The steel bases of all DeWalt woodworking machinery must be perfectly square, flat and true. Both home shop and heavy duty industrial machines are produced on the Cincinnati Shear and Press Brake shown.



The 5 Series x 10' All-Steel Press Brake has a capacity of 90 tons. Accuracy is maintained by exclusive Cincinnati interlocked construction.



The 1810 Series All-Steel Shear has a capacity of ¼" x 10' mild steel plate and shears with micrometer accuracy.

Photos courtesy DeWalt Inc., Lancaster, Pa.

This performance story from DeWalt Inc. tells of improved quality and reduced costs. We quote: "Before purchasing the Cincinnati Shear and Press Brake, we bought formed channels and arc welded them together at the seams. We now buy sheet steel stock—then cut, punch, form, and spot weld the steel bases in our own plant. We have ***reduced costs on this operation by over 1/3*** on the first run employing these methods, and expect costs to diminish still more as operator familiarity and efficiency increase. In addition to the cost factor, it was previously difficult to maintain precision flatness in the tables. Using the new methods and the Cincinnati machines, we now have no difficulty."

Note the improved design of the Model MB "Power Shop" machine shown at right above. The new, improved cabinet is now produced on the Cincinnati Shear and Press Brake at an ***overall cost reduction of 15%***. Previously the cabinet at left was a purchased item.

Write Department B for Catalog B-4R and Catalog S-7R and consult our Application Engineering Department about your production problems.

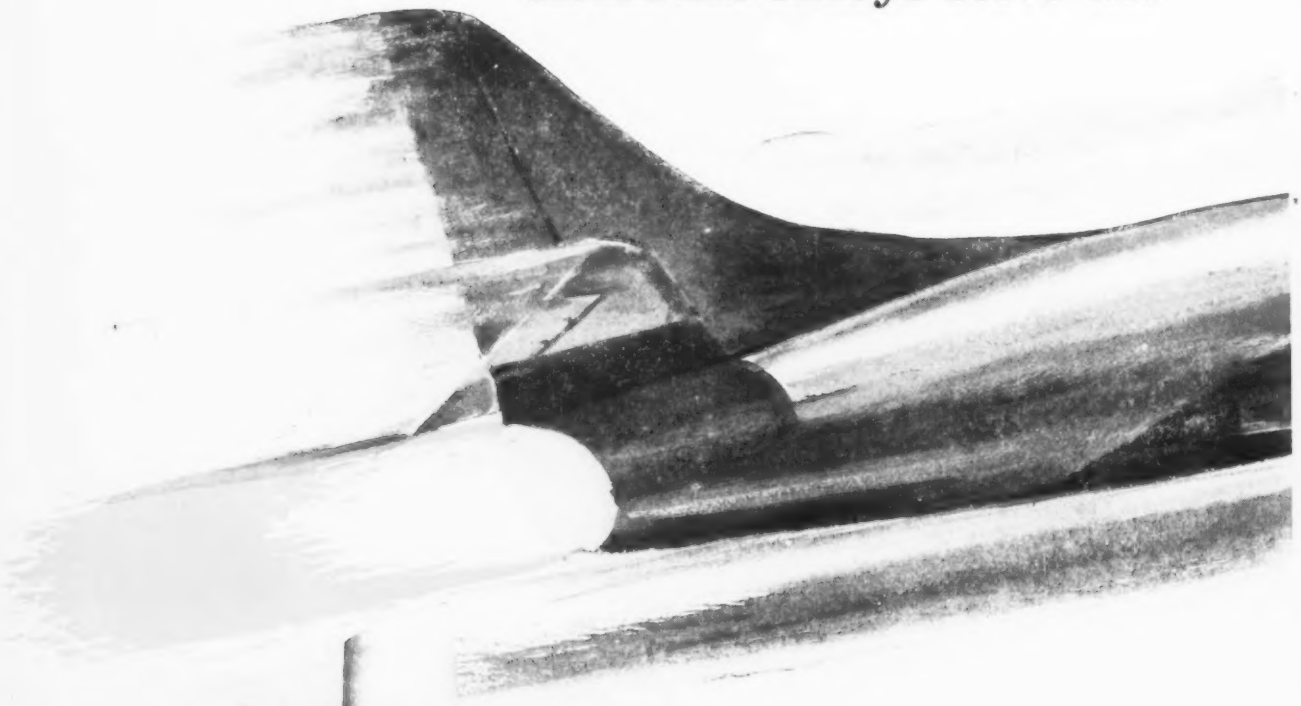
THE CINCINNATI SHAPER CO.

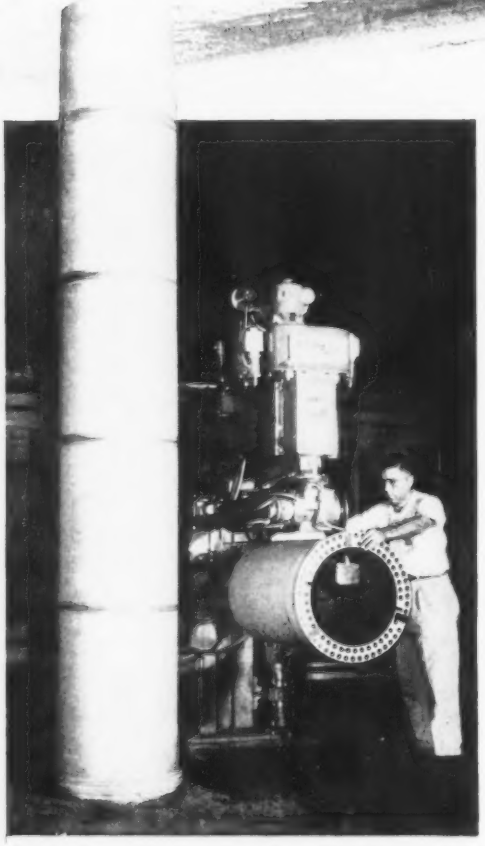
CINCINNATI 25, OHIO, U.S.A. SHAPERS · SHEARS · PRESS BRAKES

CINCINNATI

HEAT • WEAR • CORROSION

HAYNES Alloys solve the



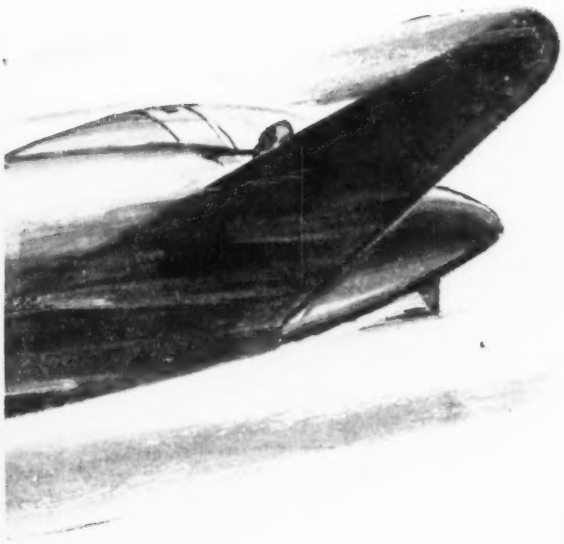


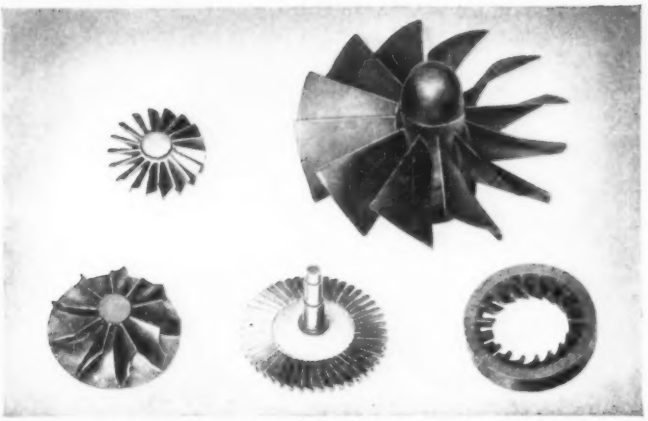
HEAT

2,000 degree jet blast!

The jet engine tailpipe of the Navy's A4D "Skyhawk" operates at extremely high temperatures. That is just one of the many reasons why this part is made of MULTIMET alloy. This is one of 6 HAYNES wrought alloys that have unusual resistance to high temperatures and oxidation. Because of their exceptional properties, HAYNES alloys are being used extensively in such parts as after-burner components, jet engine tailpipes, turbine blades, and nozzle vanes.

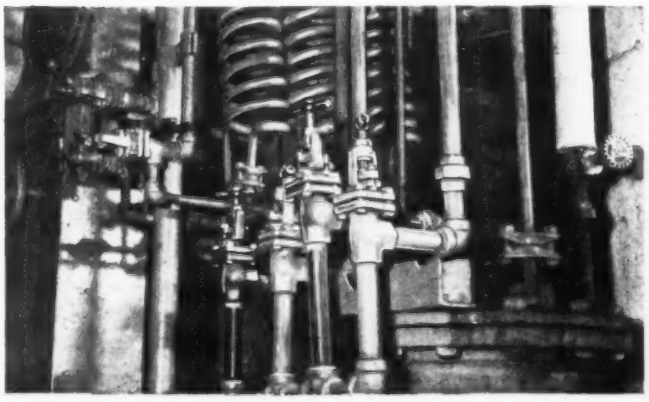
tough problems





PRODUCTION Intricate turbine wheels mass-produced.

HAYNES' investment-casting method offers a selection of alloys developed for economical operation over a wide temperature range. Blades and wheels are produced as one integral part to as-cast tolerances that permit operation with unusually fine clearances at high speeds.



CORROSION Withstands corrosive chlorine 10 years!

Handling highly corrosive liquid chlorine was an expensive maintenance problem—until valves made of HASTELLOY alloy C were installed. This is just one of the many corrosive difficulties met by HAYNES Alloys. They also have excellent resistance to hot mineral acids, strongly oxidizing salts, and powerful gaseous oxidants over a wide range of temperatures and concentrations.

If you have an application that is creating a tough heat, wear, or corrosion-resistance problem, you will find it profitable to check with HAYNES Stellite Company. In practically every industry, you will find HAYNES Alloys doing a better job, lasting longer, reducing maintenance and proving most economical.

Tell us your problem and we will send you descriptive literature on the HAYNES Alloy best suited to solve it. If you would like to consult one of our technical representatives, contact our nearest sales office.

HAYNES STELLITE COMPANY
A Division of Union Carbide and Carbon Corporation

General Offices and Works, Kokomo, Indiana

Sales Offices
Chicago • Cleveland • Detroit • Houston • Los Angeles
New York • San Francisco

HAYNES TRADE-MARK ALLOYS

"Haynes," "Multimet" and "Hastelloy" are registered trade-marks of Union Carbide and Carbon Corporation

How you can save time and money with

Harvey Aluminum Impact Extrusions

Many engineers and designers are overlooking the exclusive advantages of aluminum impact extrusions. This advanced metalworking operation offers design flexibility; versatility of alloys; draft free, close tolerance parts requiring minimum machining; smooth surfaces; and significant savings in man hours, machining, and material.

Custom configuration with precision tolerances

Typical applications of Harvey Impact Extrusions are illustrated below. Harvey Impacts have a smooth surface and require no machine finishing for most commercial, ordnance, airframe, and missile applications. Harvey's integrated services provide an economical, quality product that meets all specifications of high strength, light weight, resistance to corrosion and heat, critical tolerances in wall thickness, maximum heat conductivity, and low unit cost.

Harvey Aluminum leads in impact extrusions

Harvey pioneered in the impact extruding of intricate configurations. This experienced leadership, plus technical know-how and the most advanced facilities, are available for your own specialized design requirements. The integrated Harvey engineering team of research, design, metallurgy, and quality control will expedite your product from drawing board to finished product quickly, efficiently, economically.

If you have a design that calls for hollow, closed end sections... high strength... zero-degree walls and surfaces... unusual length to diameter ratios, integral ribs, fins, and bosses... close tolerances... with volume production, low unit cost... *your Harvey Field Engineer will be happy to show you how Harvey Impact Extrusions can help solve your design problems.*

PISTON made with flat top or dome. Applications for aluminum pistons range from light horsepower engines to automotive and aircraft motors. Highest physical properties, surpassing any forging or casting. Metallurgical characteristics of Harvey alloys insure highest fatigue strength, excellent grain structure, best heat dissipation.

LANDING GEAR COMPONENT provides highest physical properties, greatly reducing material and machining costs. The impact, obtainable in various lengths, is made from aluminum alloys which assure optimum internal grain structure. This impacted piston replaces costly method of hogging out bar stock or machining a forging. Diameters of barrel are held to close tolerance dimensions with superior surface finish.

TUBE SUPPORT provides solid head on one end of tube. This unique aluminum impact extrusion offers the most economical fabrication method for a support tube application without sacrificing high physical properties. Aluminum impact eliminates considerable machining, offers maximum design versatility. Available in a range of sizes and alloys.

Making the most of aluminum . . . for everyone

HARVEY ALUMINUM SALES INC., TORRANCE, CALIFORNIA

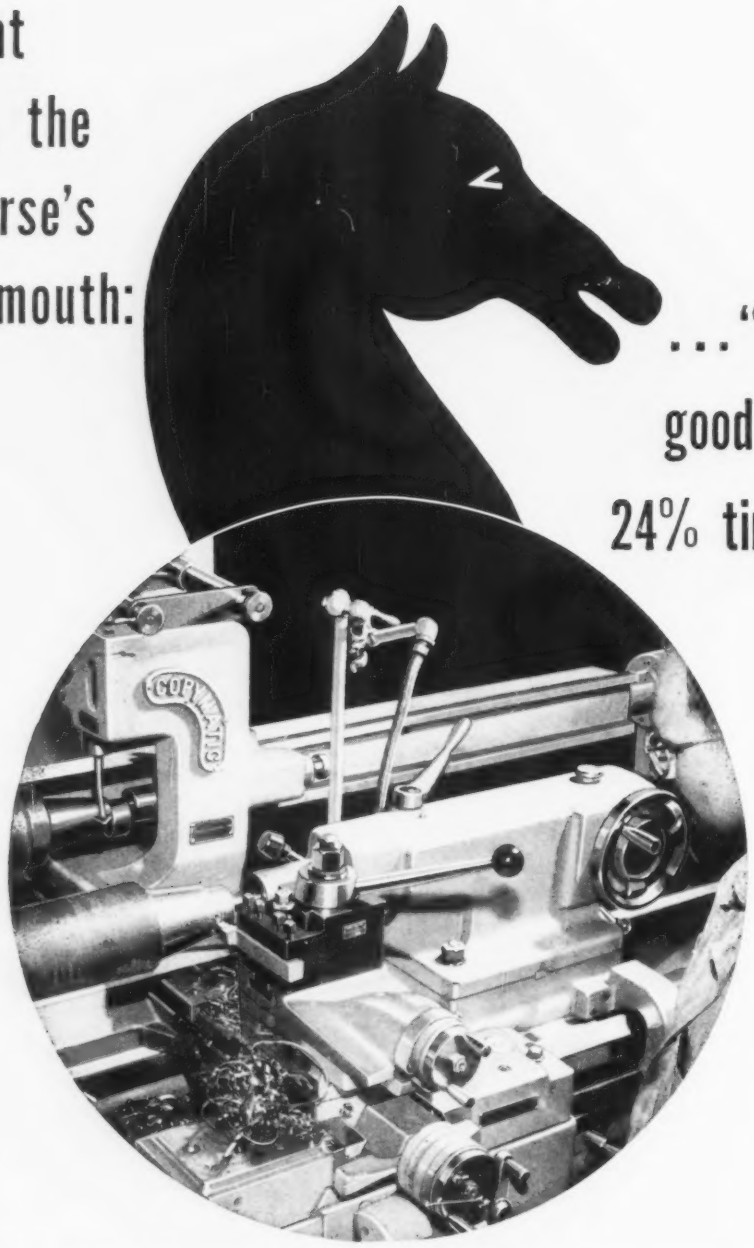
Branch offices in principal cities

HARVEY Aluminum

Harvey is a leading independent producer of quality aluminum products in all alloys and sizes: Rod and bar, pipe, tube, hollow sections, press forgings, forging stock, impact extrusions, structurals, special shapes, extrusions, screw machine products and other aluminum products. Harvey is also producing similar items in titanium and steel.

THERE'S A
COMPLETE LINE OF ROEBLING
Galvanized
ROEBLING is a specialist in galvanizing, with practically unmatched facilities for producing galvanized wire in enormous quantities and in complete size ranges. Hot galvanized is available in sizes from .283" to .035"... Roegal (drawn galvanized) from .187" to .005".
And Roebling galvanized wire can be packaged in the way most convenient and economical for you... in coil diameters of 60", 30", 22", 16" and 8"...on reels, spools or handy spoolless cores.
You *pay* for the best when you buy galvanized wire. Make sure you *get* it—specify Roebling! John A. Roebling's Sons Corporation, Trenton 2, New Jersey.
ROEBLING
Subsidiary of The Colorado Fuel and Iron Corporation
PHOTO BY McMANUS

straight from the horse's mouth:



..."a very good machine... 24% time saved!"

When a famous machine tool manufacturer reports on the performance of another's product, it is an opinion you can count on as authoritative.

The Ingersoll Milling Machine Company of Rockford, Illinois is one of the early owners of a new Lodge & Shipley 16" POWERTURN 90° COPYMATIC Lathe. Used in turning cutter housings and shanks, shafts and spindles, the lathe has proved very good, judged on performance, construction, accuracy and versatility.

If you want eye-witness proof of similar significant savings on your lathe production, the Lodge & Shipley Demonstration Room is at your service. Contact your Lodge & Shipley distributor for details or write direct to: The Lodge & Shipley Co., 3055 Colerain Ave., Cincinnati 25, Ohio.

JOB FACTS

WORKPIECE: 4" Diameter Cutter Housing
OPERATION: Turn complete including taper
MATERIAL: 4140 HR Steel
CUTTING TOOLS: Carbide
FEED: .018" per rev.
SPEED: 431 RPM
TIME: Floor-to-Floor: approx. 35 min.
RESULTS: 24% time saved

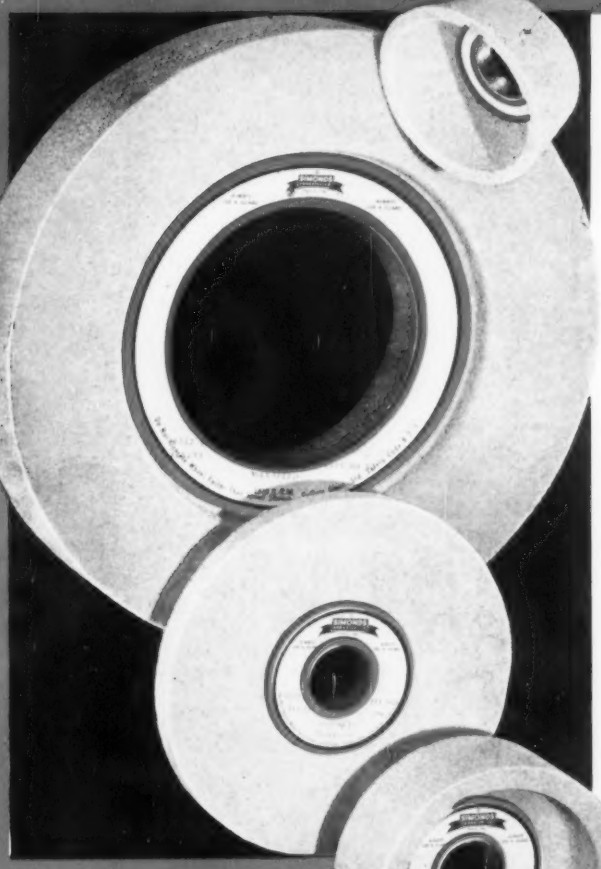
Lodge & Shipley

New and Radically Different

SIMONDS SA *Borolon*®

TRADE MARK

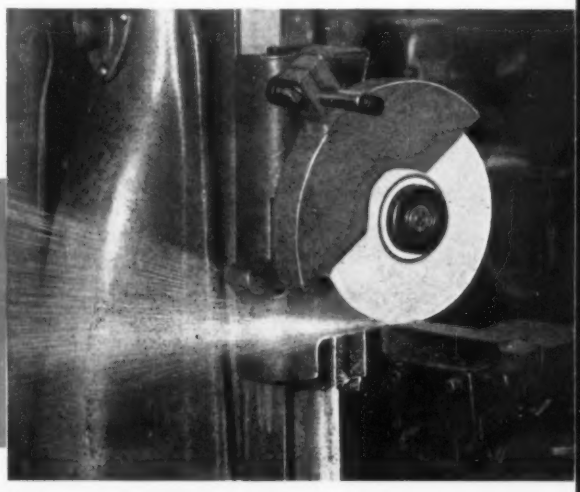
Grinding Wheels for Toolroom use



SA Borolon is a single crystal aluminum oxide abrasive possessing superior qualities over conventional white aluminum oxide abrasive. It is produced from a furnace charge consisting of a molten base with a soluble matrix which dissolves, leaving single, natural crystals of abrasive grain *without crushing*.

SA Borolon is tougher because it is free of the inner strains to which crushed abrasive is subjected. It penetrates deeper and cuts faster because each abrasive particle has more sharp, free-cutting edges. It cuts cooler because its resistance to dulling lessens frictional drag. Use these new wheels on your tool grinding jobs — and see the surprising difference in their grinding action. Write for illustrated Catalog Bulletin ESA-272.

Cooler cutting
Faster grinding
Longer life
Better finish



SIMONDS ABRASIVE CO.

SIMONDS ABRASIVE COMPANY

Tacony & Fraley Sts., Philadelphia 37, Pa.

DIVISION OF SIMONDS SAW AND STEEL CO.

BRANCHES: PHILADELPHIA, CHICAGO, DETROIT, LOS ANGELES, SAN FRANCISCO, PORTLAND, ORE.

YOUR SIMONDS DISTRIBUTOR

LOCAL STOCK
FAST SERVICE

This Modern Building Has Life-time Wiring Protection -- Thanks to

YOUNGSTOWN "BUCKEYE" CONDUIT

First National Building, Tulsa, Okla.
Owner: Fifth and Boston Corp., Tulsa, Okla.
Architect: Carson & Lundin, New York, N. Y.
General Contractor: Manhattan Construction Co., Muskogee, Okla.
Electrical Contractor: Western Division of J. Livingston Co., St. Louis, Mo.
Conduit Supplier: Westinghouse Electric Supply Co., Tulsa, Okla.

Fifth and Boston Corporation's strikingly beautiful First National Building at Tulsa, Oklahoma, utilizes quality-controlled Youngstown "Buckeye" Black Enameled Full Weight Rigid Steel Conduit exclusively, for protection of its all-important electrical wiring system.

Nationally-known building owners, leading contractors and progressive architects realize that electrical systems that don't function safely and efficiently are definitely a bad investment. So to guard against this costly condition they specify Youngstown "Buckeye" Conduit for its long, trouble-free service life.

"Buckeye" Conduit is easy to fabricate on the job—easy to fish wires through—and thoroughly corrosion-resistant to damaging elements such as water, moisture, vapor, dust and dirt.

Leading distributors in every industrial and electrical market are ready to serve you quickly from their ample stocks. They're as near as your phone—why not call today?

Standard-threaded rigid steel conduit is the only wiring system approved today by the National Electrical Code as moisture-, vapor-, dust- and explosion-proof for use in hazardous locations and occupancies.

QUALITY YOUNGSTOWN SERVICE

THE YOUNGSTOWN SHEET AND TUBE COMPANY
Manufacturers of Carbon, Alloy and Yoloy Steel
General Offices - Youngstown 1, Ohio
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For Removing RUST and SCALE

ALKA-DEOX® DERUSTING PROCESSES. Alkaline materials used both electrolytically and non-electrolytically for rapid removal of rust and scale from steel, cast iron and malleable iron. No attack on basis metal. Uses Enthone Alka-Deox 114 and Alka-Deox 134.

ENTHOL® — CLEANER AND RUST REMOVER FOR STEEL. A solvent acid cleaner for rapid removal of oil, rust and oxide from steel, zinc, aluminum and other metals to prepare them for painting or organic finishing.

DESCALER 2A — POWDERED ACID PICKLING COMPOUND. A powdered acidic compound added to water to make pickling solutions for iron and steel. Safer to handle than sulphuric acid. Gives controlled acidity to prevent overpickling.

ACTANE® 70 — POWDERED COMPOUND REPLACES HYDROFLUORIC ACID. A dispersing agent added to acid pickles to remove colloidal and siliceous films from metals. Also an additive for sulphuric and nitric acid pickles to promote faster pickling of stainless steel, aluminum and titanium.

INHIBITOR 8 — STOPS ACID ATTACK ON STEEL. An all-purpose inhibitor for acids including sulphuric and hydrochloric acids to stop attack on steel during pickling.

ACID ADDITION AGENT —STOPS ACID FUMES. A surface active material extensively used in acid pickles to reduce fuming, to give better wetting, and to promote better pickling.

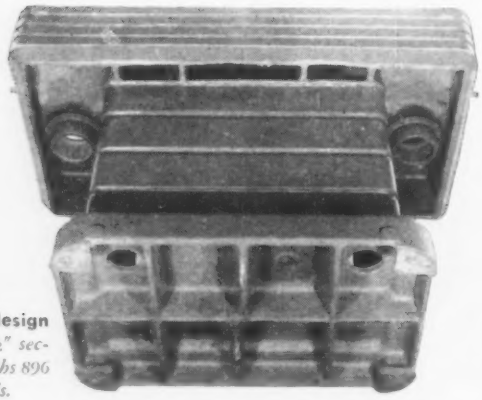
Write for fully descriptive literature.

Service Representatives and Stock Points in Principal Cities of U.S.A. and Canada, Brazil, England, France, Sweden, and Germany

ENTHONE INCORPORATED

442 ELM STREET, NEW HAVEN 11, CONNECTICUT

Metal Finishing Processes • Electroplating Chemicals



Original design *requires ½" sections, weighs 896 pounds.*

Present welded steel design *uses ¼" sections, weighs only 446 pounds.*

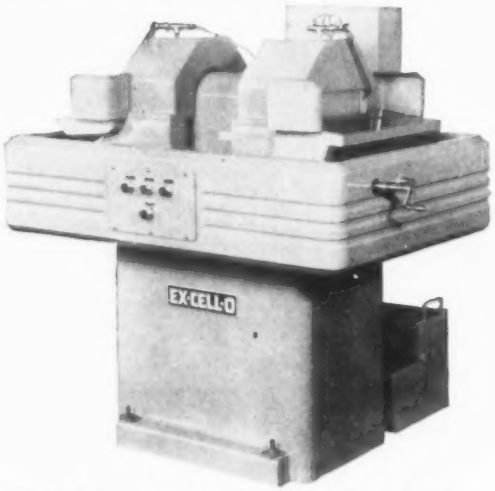
DESIGNED FOR GREATER RIGIDITY

. . . welded steel makes it better—at lower cost

THIS machine tool base was once a casting, but is now fabricated by welding. The result . . . still higher quality, more rigid machine.

Because of steel's greater strength, the required rigidity is attained with half the weight of casting. Manufacture is simplified, pattern expense is eliminated, lowering production costs.

These benefits can be duplicated on many types of machine components similar to your own through proper design for welded steel. A Lincoln specialist will gladly show you how.



Welded steel *tool grinder for sharpening single point tools of carbide, cast alloys and high speed steels. Photo courtesy Ex-Cell-O Corporation, Detroit, Michigan.*

THE LINCOLN ELECTRIC COMPANY

Dept. 1531, Cleveland 17, Ohio

Creating lower costs for industry . . . with welded design

When steel is 3 times stronger than iron . . .

Has two and one-half times the rigidity . . .

Yet costs a third as much per pound . . .

WHY

aren't your products designed for welded steel.

1 Accoloy X-weld 125 Chain
Pat. No. 2763768

2 New Shaped Master Link

3 ACCO Registration Ring

4 Registration Certificate

You get all these "plus values" in Acco Registered® Sling Chains

• When you equip your plant with ACCO *Registered* Sling Chains, you are getting slings of such *proved safety and efficiency* that they are the standard by which all other slings are judged! And, in addition, you get all these important, exclusive "plus values":

1 Accoloy X-weld 125 Chain · Where extra strength is desired in an ACCO *Registered* Sling Chain, the patented new Accoloy X-weld 125 Chain is used. Its king-sized welded area and non-kinking feature assure greater ruggedness and better service at no increase in price.

2 New Shaped Master Link · ACCO engineers have created the new Shaped Master Link which, without any increase in weight, holds its form under loads up to 18% greater than a standard round section can. This means extra security for your loads.

3 ACCO Registration Ring · The presence of this serially-numbered ring on an ACCO *Registered* Sling Chain shows that each component has been tested before assembly . . . that the assembled sling has been proof-tested to twice its working load limit . . . and that all tests have been successfully passed before registration of the complete sling and shipment from the factory.

4 ACCO Registration Certificate
Every buyer of an ACCO *Registered* Sling Chain is furnished with a Registration Certificate signed by American Chain & Cable Company, Inc. This Certificate gives assurance that the sling meets ACCO's severe requirements of quality and proof-tested performance, and that it has been individually registered on ACCO's permanent records.

Tops in safety and strength

ACCO *Registered* Slings, with *Magnaflux-tested hooks*, give the best in strength, safety, service—and long-range economy. They are available through ACCO *Registered* Sling Chain Distributors in principal industrial centers. For full data, write us at York, Pa.

WHAT "ACCO REGISTERED" MEANS

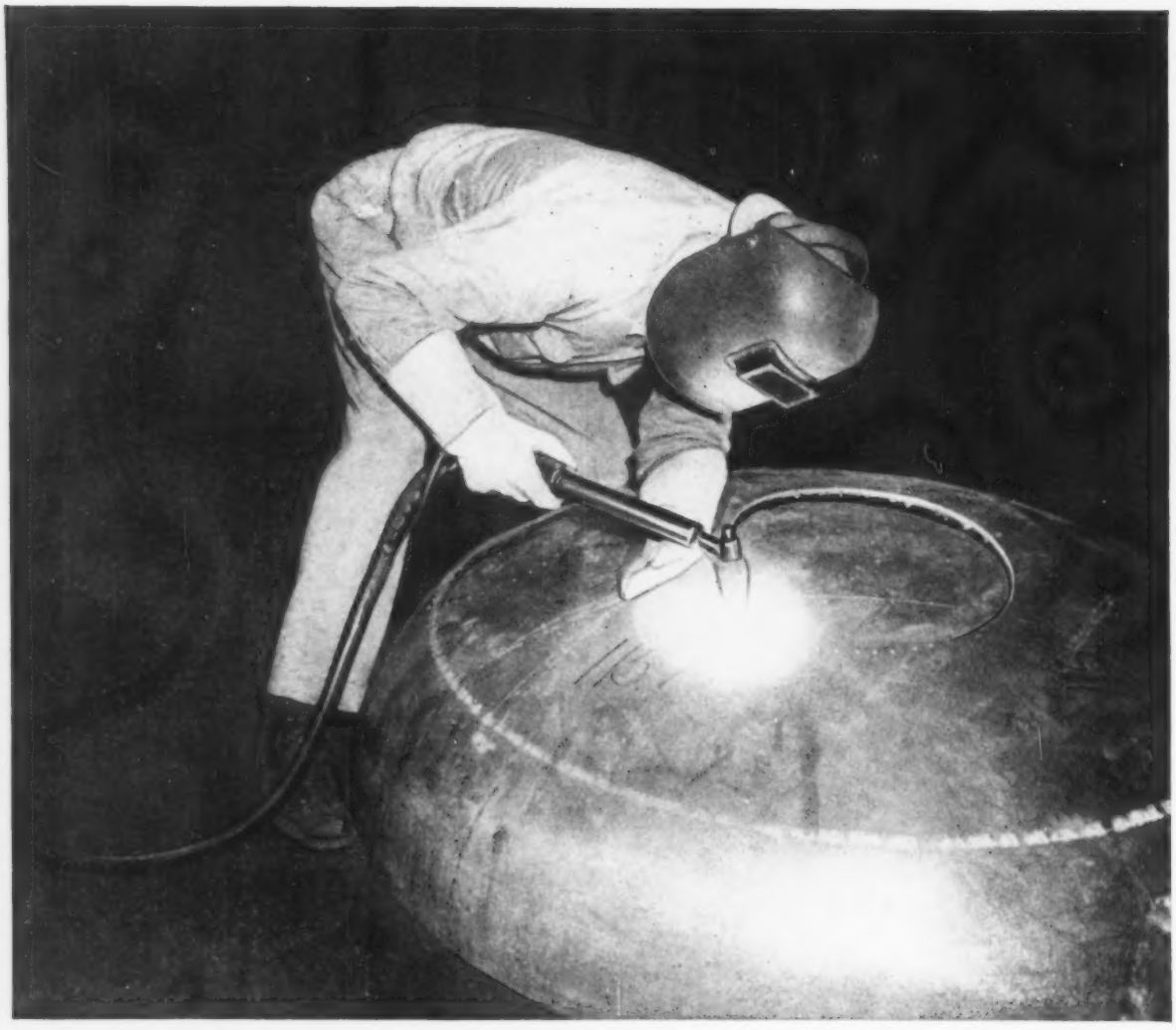
1. The best material
2. Unit safety factor (on bodies, rings, links, hooks)
3. Proof test of complete sling to twice the working load limit
4. Actual field service test of each design
5. Metal identification ring on each sling
6. Signed Registry Certificate with each sling

American Chain Division
AMERICAN CHAIN & CABLE
Bridgeport, Conn. • Factories: *York and *Braddock, Pa.

ACCO
TRADE MARK

Sales Offices: *Atlanta, Boston, *Chicago, *Denver, Detroit, *Houston, *Los Angeles, *New York, Philadelphia, Pittsburgh, *Portland, Ore., *San Francisco

*Indicates Warehouse Stocks



from one hour to one minute...

HELIARC Cutting Whizzes Through Aluminum

One of the first aluminum fabricators to use LINDE's new HELIARC cutting process reveals savings of more than 95 per cent over conventional chipping methods—jobs normally requiring 1 and 5 hours to complete are whisked through in only 1 and 4½ minutes respectively. Graver Tank and Manufacturing Company reports beveling, grooving, shaping, and cutting are all performed on ⅝-in. thick, 52S aluminum plate at substantial time, space, and cost savings.

Incredible, but true: HELIARC cutting can attain speeds as high as 600 inches per minute, and cut aluminum in thicknesses up to 1½ inches. No special skill is required. A certified welder can do excellent cutting jobs after less than one hour of instruction.

Get the full story on revolutionary new HELIARC cutting. Call your LINDE representative, or write for free illustrated literature, Form 50.095.

Linde Air Products Company

A Division of Union Carbide and Carbon Corporation

30 East 42nd Street UCC New York 17, N. Y.

Offices in Other Principal Cities

In Canada: LINDE AIR PRODUCTS COMPANY

Division of Union Carbide Canada Limited, Toronto

"Heliarc" and "Linde" are registered trade-marks of Union Carbide and Carbon Corporation.

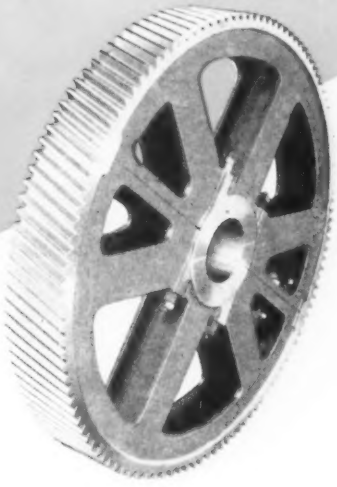
Linde
Trade-Mark

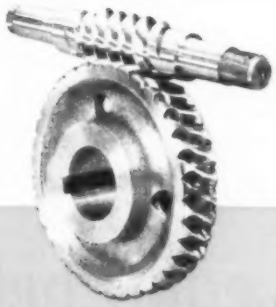
Quality with a pedigree

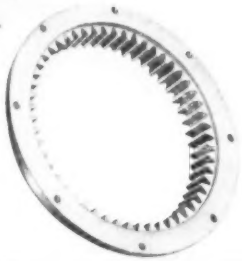
Every year more and more users of gears who demand the highest quality are turning to ILLINOIS GEAR to meet the exacting needs for this very important part of their equipment or machinery.

They have come to know and depend on ILLINOIS GEAR — a company with a rich heritage in the manufacture of quality gears . . . *from whose modern plants come the most complete line of gears in the world!*

If you use, specify or buy gears for any purpose — look to ILLINOIS GEAR as your most complete and dependable source.







Look for this mark ILL® *the symbol on finer gears*

ILLINOIS GEARS Reg. U.S. Pat. Off.

Gears for Every Purpose ... one gear or 10,000 or more

ILLINOIS GEAR & MACHINE COMPANY

2108 NORTH NATCHEZ AVENUE • CHICAGO 35, ILLINOIS

Inland Ledloy*...the original leaded steels

Twenty years ago they said it couldn't be done. But Inland tackled the problem—discovered how to add lead to steel and produced the world's first commercial leaded steel in Inland furnaces. Since then, further research and refinement has been unceasing—each new Inland technical development providing still greater production possibilities for the metalworking industry. Due to constantly improving product quality, Ledloy steels today set the standards by which all other free machining steels are compared.

Anti-aircraft guns roared through the night during the Battle of Britain, consumed mountains of shells. Without shells the guns were useless, and production was strained to feed them. A British steelman, licensed by Inland to produce Ledloy, suggested its use as a means of breaking the production bottleneck. Inland and its British licensees got to work on the production of Ledloy for this job. Where Ledloy was used on existing facilities, shell production nearly doubled, the threat of an ammunition shortage relieved.

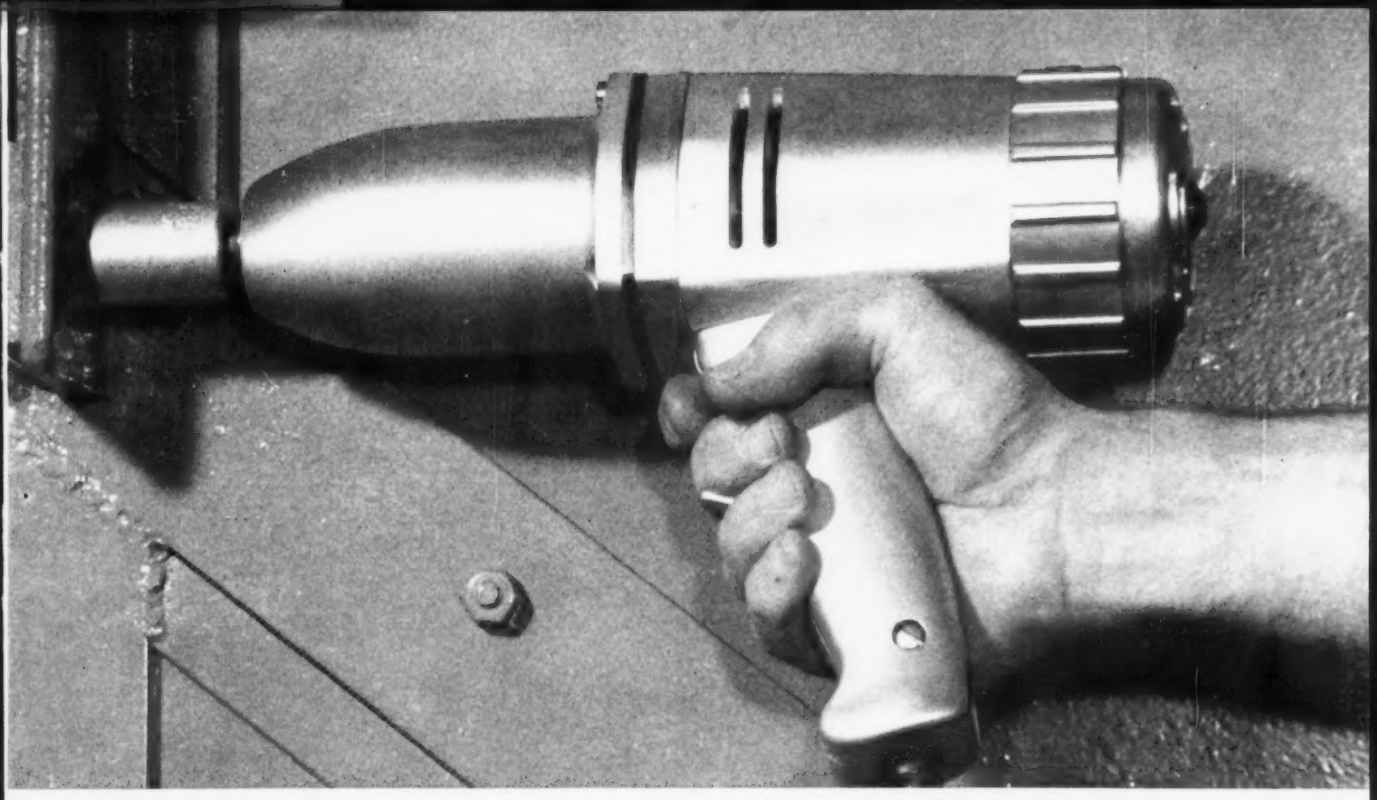
From then on, Ledloy steels increased their usefulness in the war effort. After shells were no longer needed, peacetime uses for Ledloy were discovered and grew rapidly.

Through these years, Inland has continued to refine and improve the unique machining characteristics of Ledloy. This unequalled experience makes Ledloy steels the world's most machinable.

Experience makes Inland Ledloy better

INLAND LEDLOY is sold in cold drawn form, under various trade names, by leading cold drawers and steel warehouses from coast to coast.

INLAND STEEL COMPANY *38 South Dearborn Street • Chicago, Illinois Sales Offices: Chicago, Milwaukee, St. Paul, Davenport, St. Louis, Kansas City, Indianapolis, Detroit, New York • *registered trade name of Inland Steel Company, pioneer in the development of leaded steels.*



So rugged we offer free year's service certificate!

Only B&D Impact Wrench has this proof of POWER-BUILT ruggedness

You can't ask for stronger proof of ruggedness than the free full year's service certificate covering the Black & Decker Heavy-Duty Impact Wrench. No other manufacturer dares make this offer—because no other impact wrench runs as cool, lasts as long, performs so well.

This tool is really *power*-built! Patented armature construction, heavy-duty ball bearings throughout, precision machined, heat-treated impactor and anvil—all are extra tough, extra durable. In tests, we compressed its impactor spring 100 million times—ran the tool continuously for over 600 hours—without signs of failure.

Add faster work and easier handling—and it's a cinch to see why it will pay you to ask your Black & Decker distributor for a *free* demonstration. THE BLACK & DECKER MFG. CO., Dept. 0905, Towson 4, Maryland. (In Canada: 80-86 Fleet St., E., Toronto 2, Ontario.)

Look Under "TOOLS-ELECTRIC" in Yellow Pages

Leading Distributors Everywhere Sell

Black & Decker

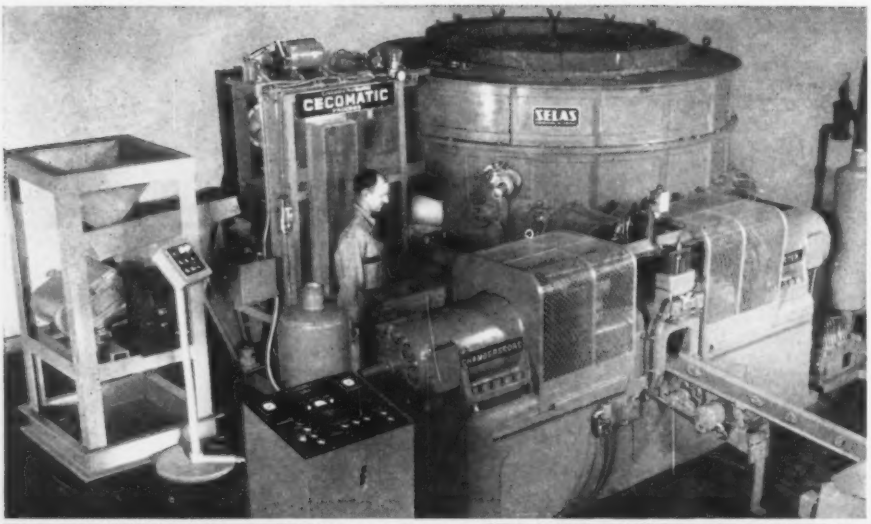
Portable Electric Tools—Power-Built to set the pace

FASTER! B & D Impact Wrench hits max. torque in 6 seconds, twice as fast as competitive tools.

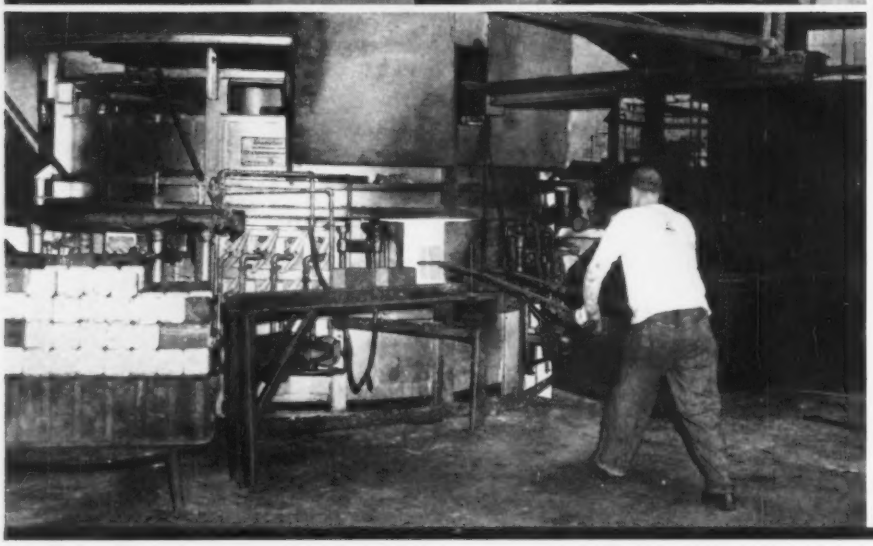
REVERSIBLE! Full power in either direction. Reversing ring design prevents accidental starting.

EASIER HANDLING! Handle positioned to eliminate nose or tail heaviness. No starting twist.

HANDY KIT! Saves time on the job. Protects tool and equipment, prevents loss, everything handy.



COMPLETE AUTOMATION is achieved by integrating Selas Gradiation® Heating into Chambersburg Engineering Company's new, Cecomatic forging process. Brass slugs, up to 1⅛" diameter x 3¼" long, are heated to 1500°F and delivered automatically to the Impacter at production rates which can be varied from 20 to 40 forgings per minute.



STEEL BILLETS, up to 7" square, are heated in this Selas Gradiation furnace at Lansdowne Steel and Iron Company. Fast heating to 1850°F . . . at rates of 2 to 5 minutes per inch of thickness . . . virtually eliminates scale, thereby reducing billet weight 10%. Fast heated billets are forged at temperatures 300°F below conventional methods.

IMPROVED FORGEABILITY plus savings in labor, time, floor space . . . with SELAS HEAT PROCESSING

Improved forgeability, directly attributable to ***FAST*** heating, reduces power requirements at the usual forging temperatures, or, for given power applied, permits an increase in the amount of flow or deformation. More importantly, this increased capacity for hot work can be used to advantage to permit working metals at lower temperatures, with no increase in applied work.

Whether your forging requirements call for fully automatic or manual handling operations, you always get these benefits from Selas Gradiation heating: rapid start-up . . . low cost per work-piece heated . . . virtual elimination of scale . . . precise controllability . . . ***FAST*** heating which helps pace production . . . compact equipment which reduces floor space requirements.

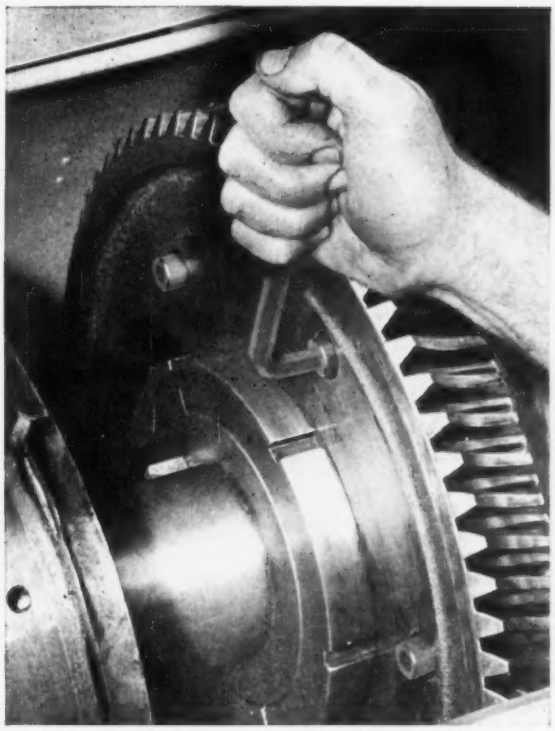
In heat treating, brazing, forging, strip-heating and other continuous operations involving both ferrous and nonferrous metals, Selas engineers can design Gradiation heating to help speed production, improve product quality, reduce costs.

Our engineers will be glad to discuss how Selas Gradiation methods can be tailored to your heating needs. Address Dept. 16.

SELAS
CORPORATION OF AMERICA
DRESHER, PENNSYLVANIA

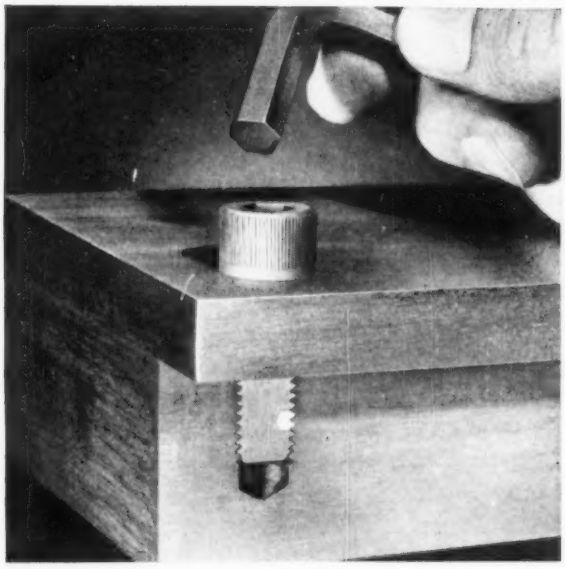
Heat and Fluid Processing Engineers

DEVELOPMENT • DESIGN • CONSTRUCTION



The ordinary fasteners securing the worm wheel to the drum shaft in this automatic screw machine loosened, causing $120 worth of damage to parts. Labor for the repair job cost $100. The ordinary fasteners were replaced with self-locking UNBRAKOS, and there has been no trouble since.

Vibration won't loosen self-locking UNBRAKO socket cap screws



HOW IT LOCKS. The tough, resilient Nylok locking pellet keys itself into the mating threads. It forces threads together and locks the screw securely—whether or not the screw is seated.

UNBRAKO socket screws with the Nylok* self-locking device eliminate fastener problems caused by vibration.

Take the drive system in the automatic screw machine illustrated above, for example. The screws originally used to secure the worm wheel to the drum shaft loosened, causing considerable damage, besides loss of production time. These have now been replaced with self-locking UNBRAKO socket head cap screws and the trouble has been eliminated.

An UNBRAKO socket screw with the Nylok self-locking device is a single unit. Just screw it into any tapped hole. Seated or not, it locks positively wherever wrenching stops. Constant vibration or endless running of a machine won't affect these self-locking UNBRAKOS. The screws will not work loose!

Write today for your copy of Form 2193, which gives catalog and technical data on the complete line of UNBRAKO socket screws with the Nylok self-locking device. Or see your local industrial distributor. Unbrako Socket Screw Division, STANDARD PRESSED STEEL CO., Jenkintown 17, Pa.

UNBRAKO SOCKET SCREW DIVISION

STANDARD PRESSED STEEL CO.

SPS

JENKINTOWN PENNSYLVANIA

*T.M. Reg. U.S. Pat. Off., The Nylok Corporation

it's NEW...
it's WIDE...
it's BRIGHT

MicroRold® STAINLESS SHEET

Type 430 Bright Finish

up to 48" WIDE

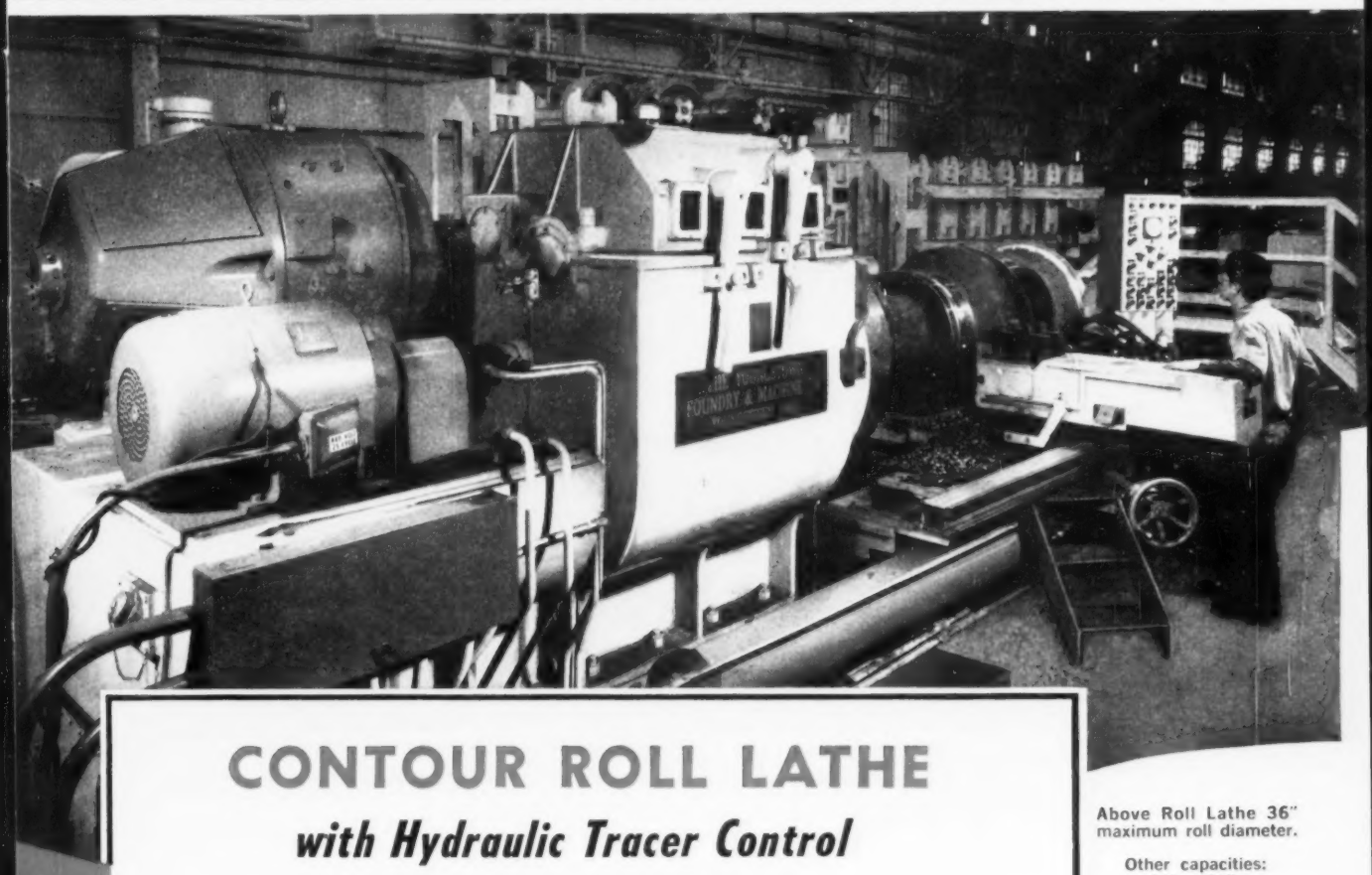
BRIGHTER THAN EVER!—MicroRold stainless steel Type 430 in the NEW Bright Finish is now immediately available in sheets up to 48" wide offering new usefulness and economy in stainless fabrication. Produced with the same micro-accuracy of gauge for which MicroRold 36" is well known, Type 430 Bright up to 48" wide gives greater latitude in applications for quality stainless steel.

MicroRold 430 is also available in the regular commercial finishes and MicroRold stainless in other grades are now produced up to 48" wide. Complete details sent on request.

Washington Steel Corporation

5-L WOODLAND AVENUE WASHINGTON, PA.

Turn Rolls *Automatically* with "YOUNGSTOWN"



CONTOUR ROLL LATHE

with Hydraulic Tracer Control

Above Roll Lathe 36" maximum roll diameter.

Other capacities: 48" — 60"

Designed to turn rolls better in any plant... from the smallest rod mill to the largest blooming mill

f&m *features:*

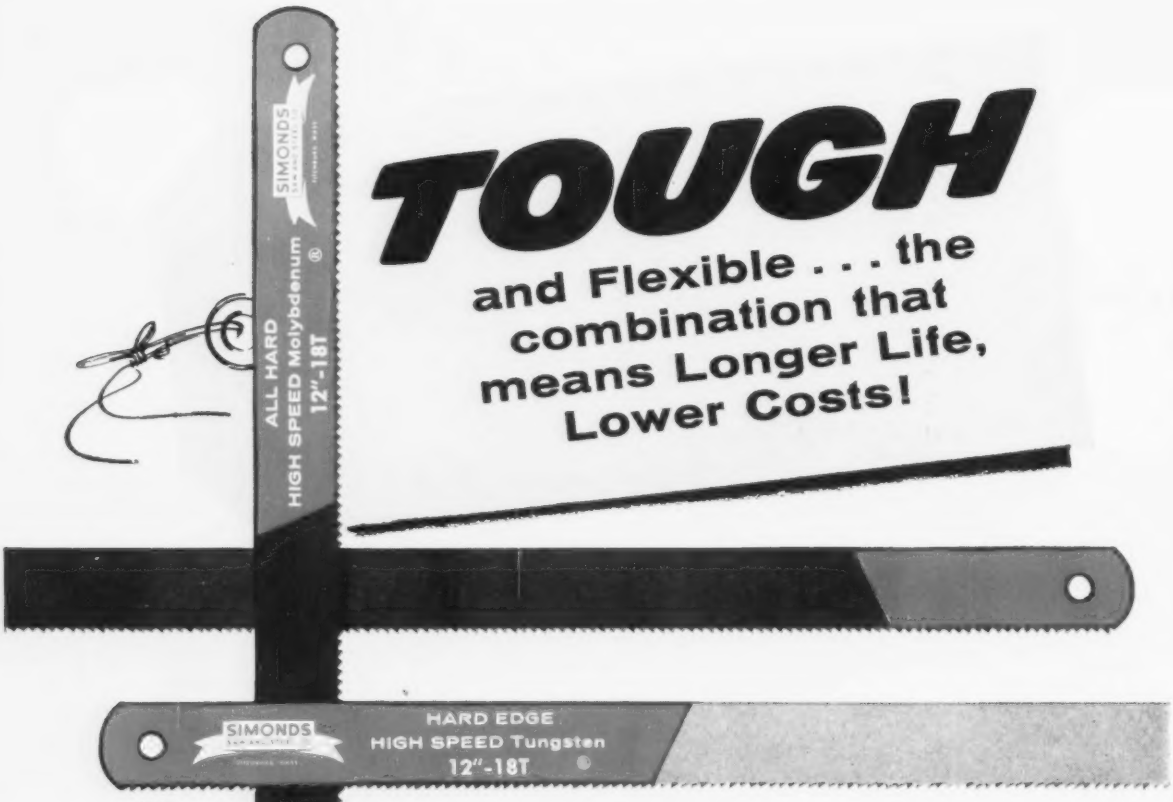
- The rigidity of turning in neck housing and bearings eliminates tool chatter; allows heavier cuts and reduces tool cost.
- Complete hydraulic tracer control insures smoother, more accurate finish.
- Tool post and carriage designed to use either single point carbide-tipped tools or regular high speed tool steel roll turning tools.
- Ways on carriage and tail stock are non-metallic, which greatly extends service life.
- Timken roller bearings throughout herringbone gearing; automatic lubrication.

"YF&M" precision-built lathes turn rolls (either on necks or centers) with accuracy and fine finish. They have utmost rigidity and necessary speeds to cut hard alloy iron and mild steel rolls, with exceptionally low tool cost. These lathes are also available without tracer control, for cutting down back-up rolls and for cutting spalls from strip mill rolls. Tell us your needs.

The Youngstown Foundry & Machine Co.

SERVING INDUSTRY SINCE 1885

Youngstown, Ohio

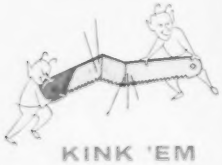


TOUGH

and Flexible . . . the combination that means Longer Life, Lower Costs!

BEND 'EM

TWIST 'EM



KINK 'EM

STEP ON 'EM

Ask for a Twister Demonstration, or better yet, try a "Red End" Blade yourself.

SIMONDS

"Red End"

HACKSAW BLADES

(Hard Edge)

Simonds "Red End" Hand Blades are TOUGH *AND* FLEXIBLE! We make 'em of Simonds Cross-Rolled Steel for quick and easy cutting and *longer life*. SIMONDS CROSS-ROLLED PROCESS PROVIDES THE TOUGHEST GRAIN STRUCTURE FOR MAXIMUM RESISTANCE TO WEAR AND ABUSE.

Simonds offers three types of quality blades to do specific cutting jobs faster, easier, straighter: STANDARD STEEL for general all-around use; HIGH SPEED MOLYBDENUM for longer wear and dependable service; HIGH SPEED TUNGSTEN for best results in cutting tough alloy steels. Furnished in all standard lengths and tooth sizes for specific applications. All-Hard Blades are also available for those who prefer a rigid type blade. Make *your* hacksaw dollars go farther with Simonds "Red End" Blades.

For Fast Service from Complete Stocks

Call your

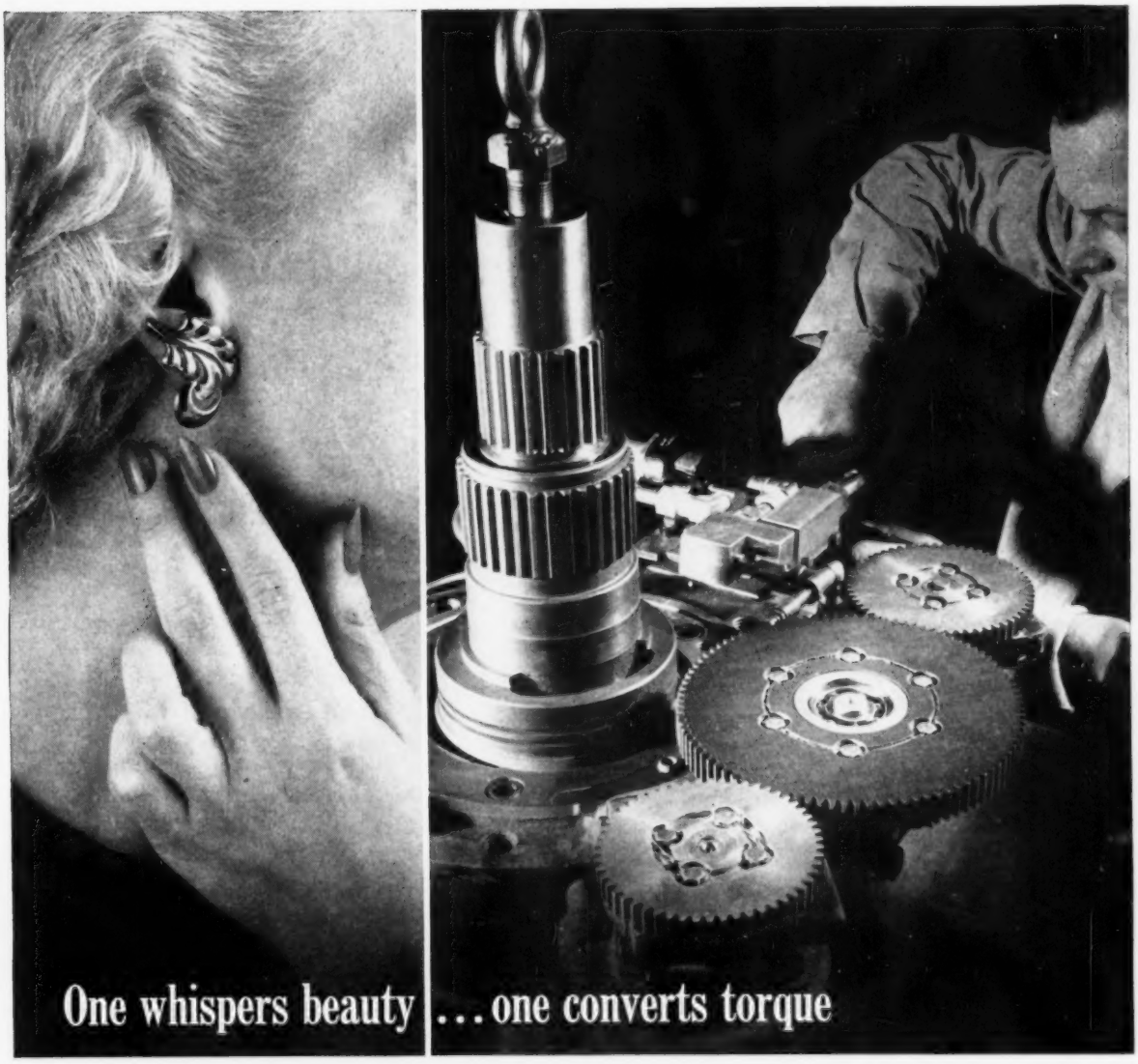
SIMONDS Industrial Supply DISTRIBUTOR

125 years of growth 1832-1957

SIMONDS SAW AND STEEL CO.

FITCHBURG, MASS.

Factory Branches in Boston, Chicago, San Francisco and Portland, Oregon
Canadian Factory in Montreal, Que., Simonds Divisions: Simonds Steel Mill, Lockport, N. Y. Heller Tool Co., Newcomerstown, Ohio, Simonds Abrasive Co., Phila., Pa., and Arvida, Que., Canada



both are vapor degreased by Columbia-Southern Trichlor

Columbia-Southern's neutrally stabilized Trichlorethylene is rapidly becoming the preferred vapor degreasing solvent for an endless variety of metal products and component parts.

Ornamental jewelry such as milady's earrings may weigh but an ounce or less. However, small metal pieces . . . or huge 3300 pound torque converters . . . both profit from the efficient, rapid vapor degreasing of Columbia-Southern Trichlor.

An outstanding property of Columbia-Southern Trichlor is its exclusively developed neutral-type stabilization. This protects the solvent from the action of light, heat, oxygen and acids . . . prevents decomposition and loss of effectiveness.

Columbia-Southern Trichlor cleans the most delicate and intricate parts quickly and efficiently . . . removes dirt, chips, grinding compounds, graphite, oil and grease. Furthermore it is non-flammable and its high vapor density and low boiling point keep vapor loss low . . . give you the figurative "many more miles per gallon."

Columbia-Southern Trichlor is a quality product, made to extremely rigid laboratory standards. It is available in tank cars, tank trucks and drums. Order yours today from your nearest Columbia-Southern sales office or from your solvents distributor.

COLUMBIA-SOUTHERN CHEMICAL CORPORATION
SUBSIDIARY OF PITTSBURGH PLATE GLASS COMPANY
ONE GATEWAY CENTER · PITTSBURGH 22 · PENNSYLVANIA

DISTRICT OFFICES: Cincinnati • Charlotte
Chicago • Cleveland • Boston • New York
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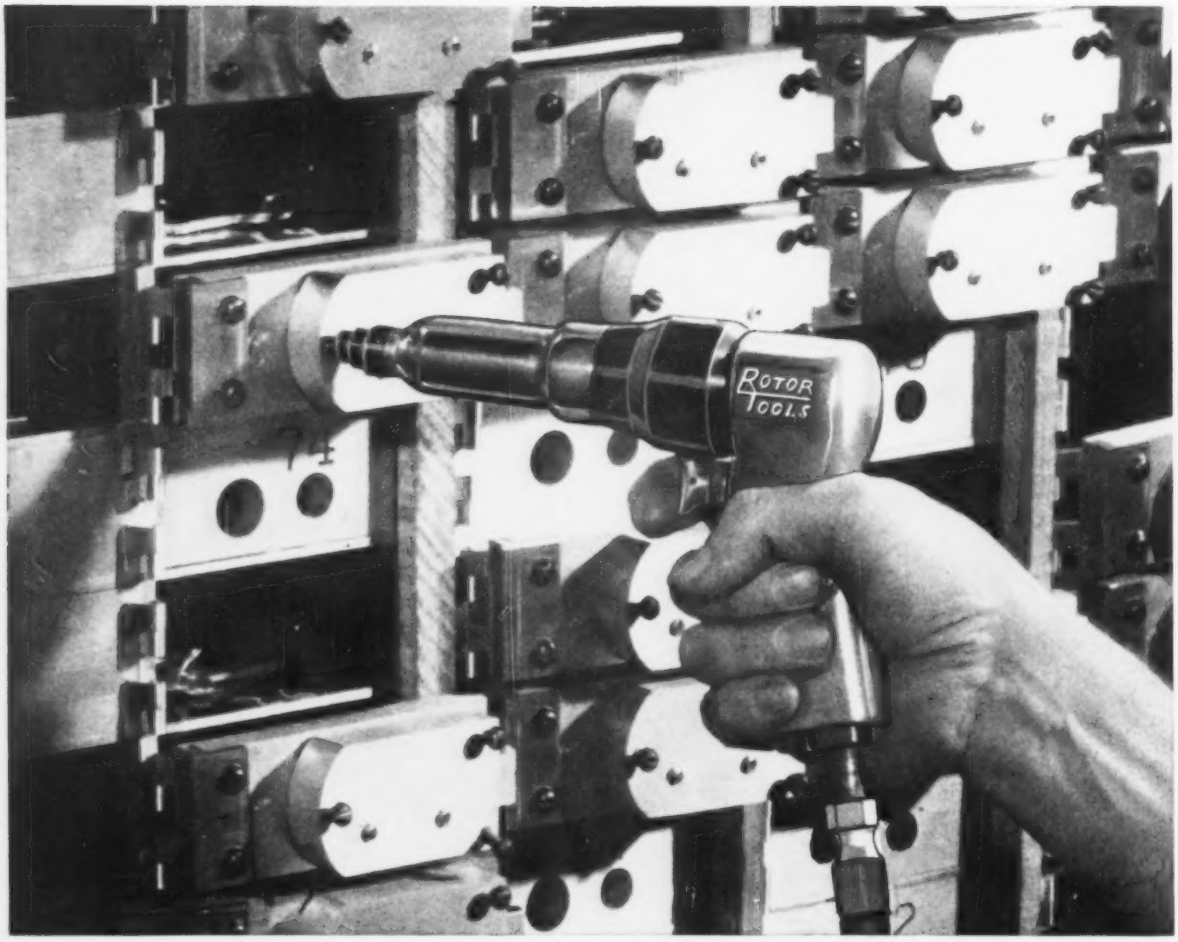
IN CANADA: Standard Chemical Limited
and its Commercial Chemicals Division



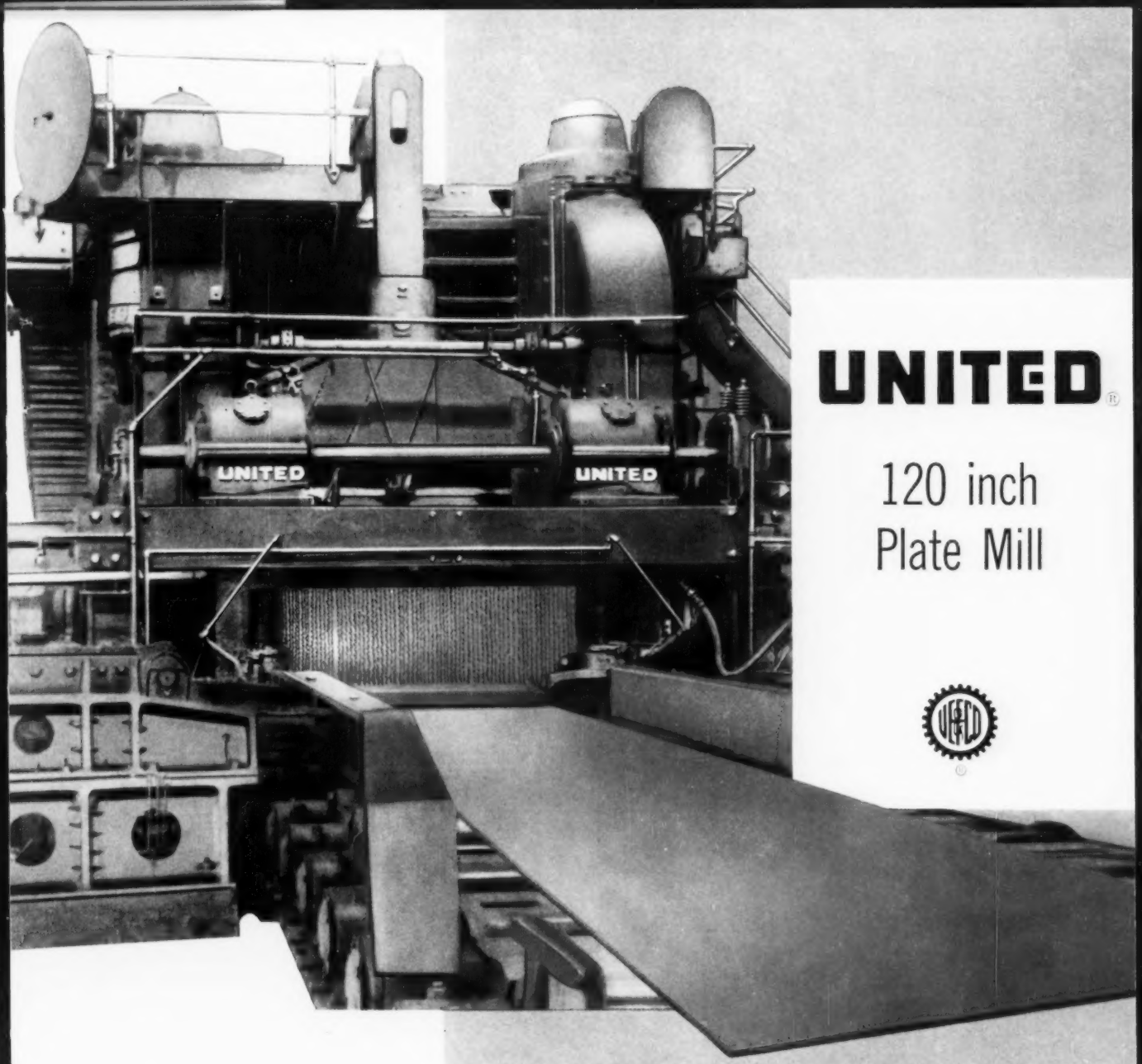
Cuts screw-driving time 66%

APPLICATION: Rotor S-02 Air Screw Drivers on vault assembly job *paid for themselves in 8.6 weeks.* **RESULT:** Time per unit with former hand screw drivers was 13 seconds. With the 2000 rpm S-02 PRC, it is 4.4 seconds.

Rotor S-02 screw drivers and nut setters are available with three types of drives, with reversible or non-reversible motor, lever or pistol throttle, and with long or short angle head (with six different spindles). At least three speeds for each model. All models are quieter. Ask for a demonstration on your job. Bulletin 46 free on request. The ROTOR TOOL Company, Cleveland 32, Ohio.

Rotor Air Tools: Assembly Tools • Drills • Small Wheel Grinders
Straight Grinders • Vertical Grinders • Scalers • Chippers • Rammers
Rotor High-Cycle Electric Tools: Grinders • Polishers • Sanders

ROTOR TOOLS®
CLEVELAND, OHIO



UNITED®

120 inch Plate Mill

UNITED

ENGINEERING AND FOUNDRY COMPANY
PITTSBURGH, PENNSYLVANIA

Plants at PITTSBURGH • VANDERGRIFT • YOUNGSTOWN • CANTON
WILMINGTON (LOBDELL UNITED DIVISION)

Subsidiaries: ADAMSON UNITED COMPANY, AKRON, OHIO
STEDMAN FOUNDRY AND MACHINE CO., INC., AURORA, INDIANA

Designers and Builders of Ferrous and Nonferrous Rolling Mills, Mill Rolls, Auxiliary Mill and Processing Equipment, Presses and other Heavy Machinery. Manufacturers of Iron, Nodular Iron and Steel Castings, and Weldments

UNITED *can serve you no matter where in the world you are.*

ONE-TON TEST

proves physical strength of "Integrated" field coils in ALLIS-CHALMERS MOTORS

It's not likely a field coil of a motor would ever be punished this way. But tests like this illustrate the inherent ability of Allis-Chalmers "INTEGRATED" FIELD COILS to withstand the stresses created by the most severe loading conditions of a motor.

Available only on Allis-Chalmers Motors

"Integrated" field coils, available only on Allis-Chalmers motors, are enveloped in oriented glass fibers and heat-stabilized resins. These are securely locked to poles to resist mechanical force. High dimensional stability and tensile strength characteristics assure long life under the toughest of operating conditions.

Coils are surface sealed against atmospheric contaminants. In addition, the coefficient of expansion of insulation is similar to that of copper. Heat transfer qualities are excellent. "Integrated" coil structures can withstand the most severe thermal cycling found in normal operation.

Exclusive Allis-Chalmers

"Double-protection," combining new "Integrated" field coils with *Silco-Flex* all-silicone stator coil insulation, is available for rotating and stationary elements of large ac or dc machines with operating temperatures through Class B range.

For the whole story of Allis-Chalmers motors, contact your local A-C representative or write Allis-Chalmers, Power Equipment Division, Milwaukee 1, Wisconsin.

Silco-Flex is an Allis-Chalmers trademark.

ALLIS-CHALMERS

A-5276

Cuts Auto Frame Costs

Production methods for making auto frames are being modified. One producer is developing a new line which runs off hot-rolled coiled sheet rather than the traditional cut lengths. Also, the producer will shot-blast surfaces rather than install a continuous pickler. The new line is currently in shakedown stages. But already, major processing savings are indicated.

Fewer Standby Tools

Fewer machine tools owned by the Air Force will sit idle in warehouses. The trend away from buying equipment for storage is clearly marked now. As the latest type tools are bought, increasing numbers are placed with contractors for current use. Present prediction is that 80 pct of the Air Force equipment inventory will be in operation by mid-'59.

Beefing Up Mill Facilities

The trend toward bigger ingots and bigger coils is bringing a beefing up of steel rolling mills all along the line. A single casting for one section of a new blooming mill weighed 300,000 lb. It was poured from three ladles, each with two spouts. Shipment of such big items involves special routing and handling, high rates.

Speeds Creep Testing

Conventional equipment and methods for obtaining creep test data won't do on some supersonic applications. Structural and engine parts of jet planes, rockets and the like may be rated in minutes or even seconds in the future, says one expert. New equipment helps lick the testing problem. This includes (1) resistance heating units to bring test specimens to temperature fast, then hold for anywhere from a few seconds to two or three hours, and (2) special extensometers.

Ceramic-Coated Muffler

A truck producer is incorporating a high-temperature, ceramic-coated muffler on some of its 1957 models. The Porcelain Enamel Institute says the ceramic coating will greatly extend muffler life by retarding corrosion and oxidation. The truck company is taking its cue from the aircraft industry, which started using high-temperature ceramics in exhaust systems more than a decade ago.

Reconfirms Silicon's Role

Tempering a hardened steel results in a breakdown of martensite. For a steel to be temper-resistant, it must be able to resist this breakdown by virtue of its chemical composition. A recent study reconfirms the importance of silicon in this respect. Cobalt additions are also effective in retarding decomposition into ferrite and cementite.

Steel Price Policy Stays

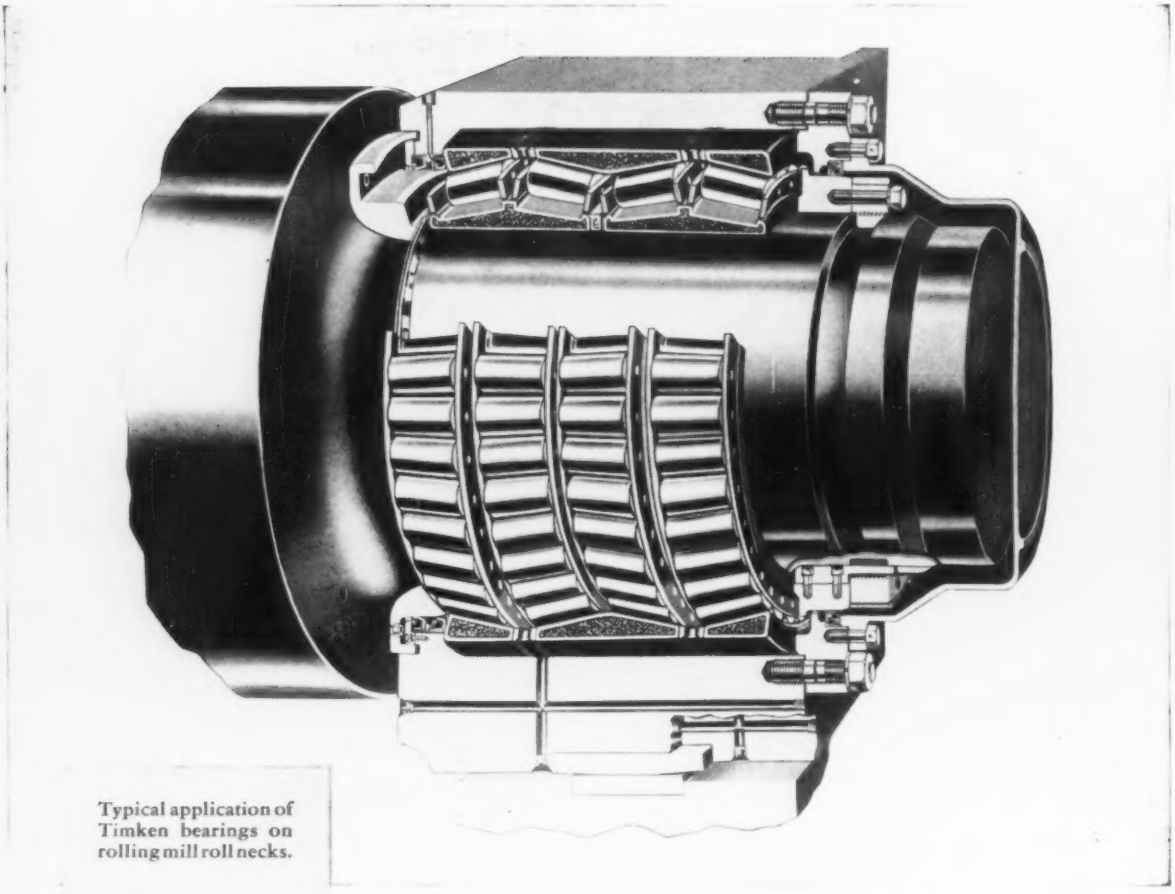
Don't look for steel mills to change their current policy of putting through two major price increases a year. According to a top sales executive of one mill, the summer increase in base prices only covers direct wages. The mills don't know what fringe benefits will cost until they've gone into effect. That's why the second increase, in the form of extras, goes through near the end of the year.

Stricter Labor Laws?

Some "very tough" labor legislation is likely to result from the Senate's sensational labor probes, some lawmakers predict. A strong move to put through a federal right-to-work law will be one result. This is expected next year, along with legislation to tighten up regulations covering union dues, pension and welfare fund collections.

Get More in Same Space

It may seem that miniaturization is well advanced, but it may have only started. The Signal Corps just completed the assembly of a military radio with an average 20,000 parts to the cubic foot. In one area, it was able to squeeze in as many as 64,000 parts in a cubic foot. But that's not all; the objective now is to build equipment with 100,000 parts per cubic foot.



Typical application of Timken bearings on rolling mill roll necks.

Why 5 famous steel slab and blooming mills chose TIMKEN® bearings for the roll necks

TIMKEN® roll neck bearings are helping to cut costs in slab and blooming mills at Lone Star Steel, Steel Company of Wales, Newport Steel, Pittsburgh Steel, and another well known mill. These five rolling mill operators have found that the long life of Timken tapered roller bearings keeps bearing cost per ton of steel rolled to a minimum.

By holding rolls rigid, Timken bearings help insure "on-gauge" operation, cut scrap loss. By holding shafts and housings concentric, Timken bearings make closures more effective, cut lubricant leakage. Grease-lubricated Timken bearings need no tubes, pipes or reservoirs. Lubricating system maintenance is greatly reduced. And no extra thrust devices are needed —Timken bearings take radial *and* thrust loads.

Geometrically designed and precision-made to give true rolling motion, Timken bearings practically eliminate friction, make acceleration easier, conserve power. Higher rolling speeds are possible. Mills can be stopped and restarted with no loss of steel—Timken bearings permit starting under full load. And prolonged roll life is assured because Timken bearings provide maximum roll neck strength, less wear. The Timken Roller Bearing Company, Canton 6, Ohio. **CANADIAN PLANT:** St. Thomas, Ont. Cable address: "TIMROSCO".

This symbol on a product means its bearings are the best.

TIMKEN® TRADE-MARK REG. U.S. PAT. OFF.

TAPERED ROLLER BEARINGS ROLL THE LOAD

Modern Management/No. 10 of a Series

DESIGNERS AT WORK: Team at Loewy Associates checks over design details. Loewy is at far right.

Industrial Design Gives More Than A New Look

Knowing What You Need Comes First

ABOUT THE AUTHOR

▪ Raymond Loewy is one of the country's top industrial designers. His first conspicuous success was the 1934 Coldspot refrigerator. Since then he has designed railroad equipment, buses, automobiles, farm tractors, appliances and a host of other products for many blue-chip companies.

▪ Few manufacturers today question the need for good industrial design. But many do not know how to buy design service wisely. And many more do not get the most from the service they buy.

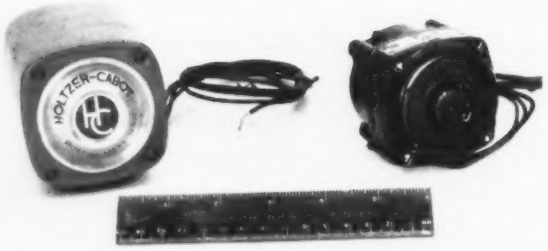
Small wonder then that some manufacturers, buying design for the first time, are mystified. They see the results of design in successful programs elsewhere. They'd like the same benefits themselves. But they lack a clear idea of how to go about it—and what they want a new design to do.

Design Goals—Products are designed or redesigned for many reasons. But unless you know what you need beforehand, a good part of your design effort can go down the drain. Here are some of the things a good design can do:

1. Boost sales if failure is due to poor appearance or operating inconveniences.—This is a common case where it's obvious that a product is unattractive or does not satisfy basic design requirements such as ease of maintenance, quality, durability, etc. It is a prime reason for redesigning consumer goods.

2. Reduce manufacturing costs so that profits can be increased or maintained without raising prices.

3. Expand markets by adding a companion product in a new price range or marketing category.—



ABOVE: Before and after view of small induction motor shows what design can do to improve appearance of industrial product. Note how manufacturer's name now stands out and smoother overall effect.

LEFT: Redesigned vacuum cleaner has only seven basic parts. This greatly simplifies repair and replacement problems. Manufacturing efficiency, lower unit costs and greater user convenience are aims of good design.

Major appliances and many other products are sold in family groupings and in numbers of models. Often a manufacturer making one basic product needs cheaper, more expensive, accessory or companion products to round out his line.

4. Command a higher price when costs cannot be cut or larger profits must be made.—This has nothing to do with the value of the product; but it is a major function of design to make a product express increased costs.

5. Prepare a product for incorporating new features which will be demanded in the near future.—A classic example here is the automotive industry.

6. Keep pace with changing fashions.—Every product on the consumer market today is sold on the basis of fashion to some degree. But even as practical a product as a farm tractor sold better when its design began to follow the dictates of automobile styling.

7. Take advantage of new manufacturing and technical advances.

8. Use new materials which may be better, cheaper, easier to process.

9. Arouse enthusiasm within a company and its dealers. Sometimes a well-designed product needs no changes at all. But the lethargy which settles in around it at the company level has to be overcome. Here, the manufacturer usually buys design services around the product—new packaging, new trademarks, etc. A minor styling change may be advisable.

BASIC CHANGE: New camera design features novel hood-raising device for faster, easier operation.

10. Fulfill the consumer's desire for "something new." This is the other side of the coin above. Sometimes a design change is warranted for no other reason than to create interest.

11. Introduce a new product.—This seems to be self-evident. But sometimes a company is so excited about a new product that it cannot see how it looks. New products are the most expensive and unpredictable. And every value and virtue must be instantly recognizable.

HOW TO ORGANIZE A DESIGN PROGRAM

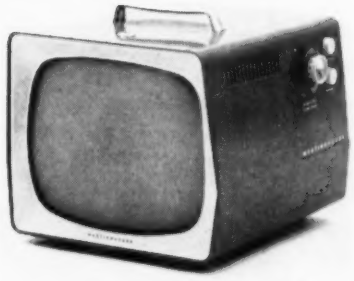
Basic Planning—No matter how sound the thinking behind a design, few programs can get off the ground without careful planning.

More and more it is necessary to create a total plan for handling the entire design program. Most successful design programs fall into two or three phases. These include:

PROBLEM: Tilting back was major problem in redesign of office chair.

Design Engineering Show

The 1957 Design Engineering Conference, sponsored by ASME, will be held in New York City, May 20-22. Exhibits will be at the New York Coliseum.



PROGRESS: Technical gains made design of portable TV sets possible. set is designed for easy handling.

1. Analysis of company goals, potentials, facilities, etc.

2. Development of a plan for making design changes in logical and practical stages.

3. The design work itself.

Getting Started—Essential to a smooth-working project is the assignment by the company of a man who is imaginative and has enough authority. This takes a man who can cut through red tape, give designers answers and go-aheads when needed. He may be the president of the company or he may be a creative engineer. Ideally, the company has a research director who can fulfill these functions without difficulty.

Where a design program is long and all-inclusive, it is wise to choose a man to guide the design program and do nothing else.

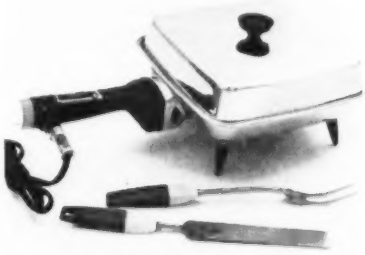
No hard and fast rule can be made for choosing the right coordinator. One of our most efficiently-operated programs worked through the purchasing agent. Another was possible only because the chief engineer was a creative man as well as a company official at the top level.

Meeting Schedules — Less often control of a design program can be committee-directed. Design is not done successfully by statistics or logic. There is never a final right or wrong. Too many opinions can stall a program. And there is a momentum to design which when interrupted may never be regained.

In many design services a counterpart to the company coordinator acts as intermediary for the designers. This client-designer committee of two should be present at all meetings. Their purpose is to make sure that schedules are being met and that original design objectives don't get off the track. They are also responsible for reporting pertinent findings as the job progresses—both to the design organization and the company.

A good design team should be based on the major talents needed to solve the problem.

If help is needed from other areas it should be called upon to solve part of the problem. For example, the design of a product may need help from graphic designers. Recently, our product division completed work on a piece of industrial machinery. At one point the graphics division developed a trademark and nameplate. As a result the company will capitalize on this new nameplate characteristic in its sales and promotion.



FASHION: Consumer goods like these lean heavily on smart styling.

For Best Results—Designers are trained professionals, but they can do no more than offer several choices of acceptable and practical designs. We find that a client gets the best results from a design organization when he:

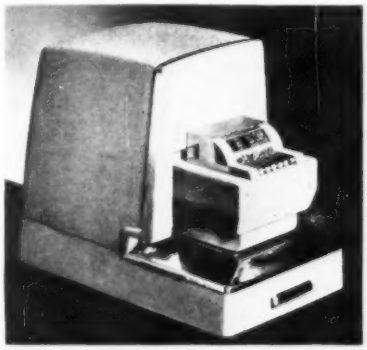
1. Hires a design organization with wide experience, and a full range of services.

2. Defines the design problem accurately and communicates it to everyone involved—both in the company and in the design office.

3. Gives the designer the correct and sufficient data to complete the job successfully.

4. Sticks to his program and his schedule. Programs have floundered more often from being slowed or stalled than from being pushed.

5. Avoids making major changes in the product in the middle of the design program.



FUNCTION: Redesign of business machine makes it easier to operate.

6. Gives authority for the program to a competent and decisive company man.

7. Maintains constant interest in the program and its results.

There are few manufacturing companies in business today which cannot and should not use industrial design in some form. This applies not only to consumer goods but non-consumer items and industrial equipment.

If most people don't buy equipment, they do use it and see it. And designers are concerned with safety, convenience and human engineering in all its aspects. Only an engineer can create the machine he builds to perform a specific function. Design is the interpreter of this product in use.

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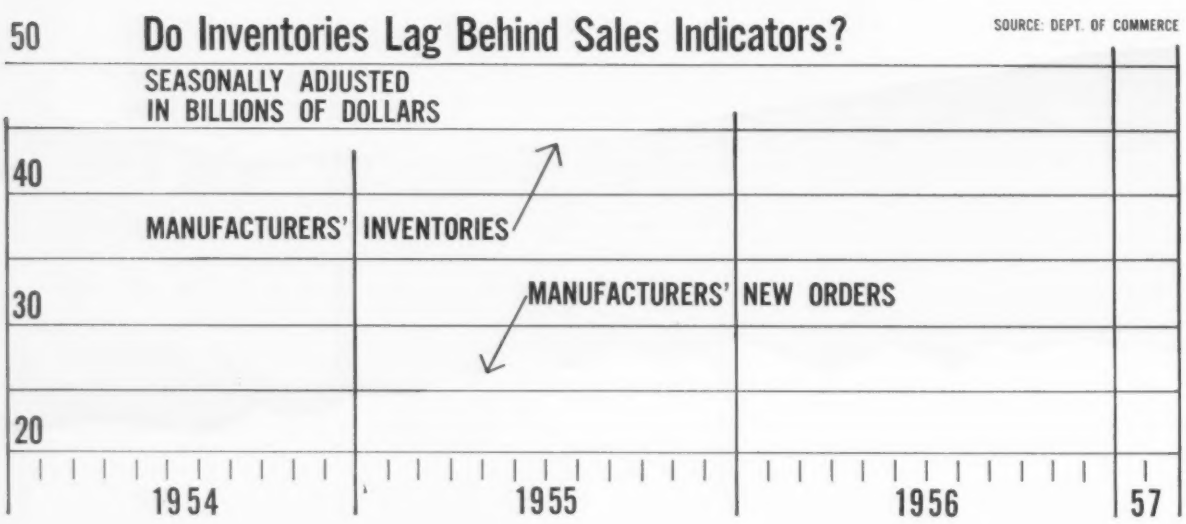

How to Cut Inventory Guesswork

Modern inventory control measures can trim excess inventory costs, improve efficiency.

Following some of these fundamental ideas can keep your inventory in tune with your markets and production.—By G. J. McManus.

■ In the current cash squeeze industry is bearing down hard on inventory control. Inventory investment can represent over one-third of a company's assets, and new controls are showing this is very often an excessive cost.

Argus Camera at Ann Arbor, Mich., found it could cut costs by over $16,000 a year by better inventory management. Methods Engineering Council in Pittsburgh reports one company saved $54,000 through beefing up inventories that had been too skimpy.

Neglected Aspect — These and other savings have not come through better guesswork on supply and demand variables. They have resulted from scientific scrutiny of known facts and relations. Modern inventory control aims basically at determining the ideal stock level for given situations.

Methods Engineering in its consulting work on inventories has found the lack of its running standard to be a big blind spot of many companies. Managements will talk about the uncertainty of the sales outlook and avoid setting up an inventory plan that will fit the probable future.

How to Start—First step in effective inventory control, says Methods Engineering, is to partition parts and materials according to value. The average company has 85 pct of its inventory money tied up in 15 pct of its parts and materials items. Many companies will ignore this fact; they will apply the same records and controls to a 3¢ cotter pin as to a casting worth thousands of dollars. Result is watered down control for the premium parts and excessive attention to the nickel and dime business.

Westinghouse Electric Corp. and General Electric Co. partition inventories into three similar groups: tight control items; medium or group control; and loose control. Under a GE plan, each part is valued on the basis of unit cost multiplied by the number of units used in a year. Annual values are then plotted, starting with the highest value and working down. The curve produced will generally suggest likely cutoff points for the three groups.

Procedure Varies—In the control of the three groups, the same basic principles are used but they are administered in different ways. Idea in all cases is to keep costs at a minimum. This does not always mean keeping inventories at a minimum.

In the tight control group, annual value is high and the general aim is to keep stored inventories at rock bottom. At GE, for example, copper for windings will arrive at some plants the morning it is scheduled for production.

Personal Touch—To permit this kind of tightrope walking, the high value items get personalized treatment. Balances are checked frequently. Expediting is handled by high level people. Individual usage forecasts are made. Purchasing people will telephone vendor rather than write.

In the medium control items, the lower annual cost makes it less ex-

pensive to maintain reserve, or protective, stocks. This cushion permits a margin of error in inventory controls. It becomes economical to set automatic control processes that operate on the laws of probability and determine inventory levels according to set formulas.

The formulas and machines seek to supply the right answers to two questions: How much should be ordered at any one time? How low should stocks be allowed to get before re-ordering?

Non - Productive Costs — From the standpoint of carrying costs alone, the smaller order is preferable. Interest, insurance and similar charges run between 15 pct and 25 pct of an item's yearly value. But the smaller the order, the more frequently the plant must restock. Westinghouse figures the non-productive elements of restocking average about $4 per order.

These two conflicting factors can be mathematically resolved to give the ideal order quantity for a given situation. Relationships can be put in table form. They can be cranked into computers.

The amount of reserve carried by a plant is set by the timing of orders. If you have 20 parts in stock when you re-order and you're figuring on a reserve of 5 units, the time between order placement and stock delivery should deplete stock by 15 units.

Reserve Problems — This gets into some of the tricky concepts of inventory control. To set a reserve level that will guarantee supplies at all times is often not economical. Companies must weigh the cost of running out of stock against the cost of maintaining a high reserve.

Companies will also go wrong on the cost of 100 pct protection. It takes a very substantial hike in reserve inventory to go from 95 pct protection to 100 pct. For this reason, modern inventory controls will often be set up on a basis that makes an occasional stockout probable.

In arriving at the ideal ordering point, control systems will crank in restocking time, rate of usage and variation in usage as well as cost of stockout and cost of carrying protective stock.

Low Cost Items—The loose control inventory group is made up of items whose low annual value makes it more economical to maintain excessive stocks to keep close tabs. For things like rivets and pins, the order points will provide a healthy reserve level.

Another big area of control is inventory in process. This can run one-third or more of total. The key to reducing process inventory is sharp production scheduling. In one plant, a foreman insisted that parts arrive on his floor at least a week before they were processed. One authority estimates that inventory is worked on only 5 pct of the time it is in process.

Computer Use Grows — One point to remember here is that the value of inventory increases as it progresses through a plant. Delays in shipping completed products are most expensive of all.

Use of computers is spreading rapidly both for inventory records and control. Crucible Steel has put an IBM-650 computer to work keeping track of 16,000 specialty steel items in a nationwide warehouse system. By means of the computer, the mill can come up with a part anywhere in its system and provide spot answers to waiting customers.

Westinghouse Electric Corp. has eight computers at work now. One of these operates from a central point to serve more than 40 field locations of the manufacturing and repair group. By means of the computer, the central office sends out regular reports giving order points and order quantities for some 4000 items.

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Barium Spins Off All Non-Steelmakers

Only Steel—Barium Steel Corp. is now solely in the steel making business. Last week stockholders approved the spinoff of seven non-steelmaking subsidiaries. These are to be managed by a holding firm, Republic Industrial Corp.

The spun-off companies are: Clyde Iron Works, Duluth; Bayonne Bolt Co., Bayonne, N. J.; Erie Bolt and Nut Co., Erie, Pa.; Industrial Steel and Forge Co., Canton, Ohio; Geometric Stamping Co., Cleveland; Cuyahoga Spring Co., Cleveland; and Wylie Manufacturing Co., Port Deposit, Md.

Mr. R. Eberstadt, former president of Barium, is chairman of the board and president of Republic Industrial Corp.

New Jersey Plant—J. A. Sisto, chairman and president of Barium, told stockholders the company plans to build a blast furnace and an oxygen steelmaking plant on 900 acres recently leased from the Pennsylvania Railroad. The site is in Burlington County, N. J., down the Delaware River about 10 miles from U. S. Steel's Fairless Works.

Eventually, Mr. Sisto said, it will be a completely integrated steel plant.

Steel Units—Barium Steel Corp., through its subsidiary, Phoenix Iron & Steel Co., continues to own: plate division, Harrisburg; structural and steel tube divisions, and the Phoenix Bridge Co., Phoenixville, Pa.; and the blast furnace division at Chester, Pa. Phoenix Iron & Steel Co. has an ore mining subsidiary, and an ore shipping company.

New Management

Union Screw & Manufacturing Co., Pittsburgh, has been obtained by I. F. Levitt. One of the first chores of the new management will be to move city offices from their present location in the West End to, the Frick Building.

Wall Street Takes Another Look

Investors back away from steel in face of light business decline.

But the adjustment in steel stock values is about usual for a period of reappraisal.

Analysts figure real test for management will come late next year.—By Walter Gutman.*

■ Thus far in 1957 Wall Street has been reappraising the steel industry. At the end of last year the money capital was definitely enthusiastic about the industry, and steel stocks were making new highs almost daily. But when faint signs appeared of a dip in demand this enthusiasm cooled and steel stocks began a decline which ended only recently. The typical stock lost 30 pct of its top value.

While this may look like a big percentage, it's about usual for a reappraisal move. Chemical stocks, long the favorite group for investors, lost about this much during 1956 which was a year when Wall Street took a new look at them. The fiber glass stocks have had almost a 50 pct readjustment.

It All Depends — Wall Street's main worry is: Is it true that the steel industry is different than it was? Is it true that prices won't be cut in a buyer's market? Is it true that the break-even point is 50 pct or lower and that steel companies can make almost as much operating with tight control of costs at 87 pct as they could when they were going at slam bang capacity? If experience shows that these things are reasonably true, then Wall Street will love the steel stocks again. If it isn't reasonably true, then Wall Street is going to leave the steel industry cold.

There are certain things about the steel industry today which are a sad surprise to all of us. The auto industry is quite obviously ailing, and in my lone opinion, will continue ailing until a proper diagnosis is made.

From Cars To Calypso — The auto industry is going through a basic change which Detroit doesn't want to recognize. It used to be the industry which gave most Americans the most pleasure but now it has become America's greatest national necessity. This shift from pleasure to necessity means a shift from an aching desire to own a new car to contentment with a reliable machine.

Millions of people still like what Detroit turns out, but an increasing number has ceased to be thrilled, and instead of buying new cars, they are buying trips to the Calypso Islands and elsewhere. This shift of purchasing power from autos to travel is suddenly beginning to play a vital role in the economics of the steel industry.

What's The Cure?—I don't see any real cure in sight, partly because Detroit is unwilling to recognize and adjust itself to the change and partly because a major change in the characteristics of an industry cannot really be cured. However, I think it's also true that the growth of the population and the road building program will mitigate the change and that no real, permanent harm will be done either to the auto or steel industries—but the problem is one which is going to take some thought and will get it by investors.

My solution is to go back to Henry Ford for a hint—don't have a new model every year; instead have a basic model, improve it when there are basic improvements to make, have it well-styled, etc., but have it basic.

Other Soft Spots—The housing industry is ailing too. In this case there's no mystery as to what it's suffering from—just a knock on the head by the hard money boys. Maybe it's a good thing in the long run but at present it's one of the minus factors that Wall Street has to consider because a downward dip in housing means not only a smaller direct use of steel but also a depressant on the consumer durables market.

Symptoms of decline or lack of growth in three important markets is something which investors must appraise soberly, and to these we must add farm equipment, wire and galvanized productions which are not so robust.

The Strong Points — Cheerful-minded people in Wall Street feel that these indications of non-growth are nothing to worry about. They point to booming heavy construction, to the never-ending growth of tin and terne plate demand.

And then there are the oil wells, always getting deeper and demanding more pipe; and the pipelines, still spreading out everywhere; and the big shipbuilding program with 10 years' business in sight. So the steel industry is headed for at least a near-record year, with 1958 likely to prove at least as good and maybe better.

In the process of reappraising, Wall Street listens to both the cheerful and the non-cheerful. And in recent weeks it has come to favor the cheerful view somewhat.

The Management Angle — The most practical result of Wall Street's current re-examination of the steel industry will be much greater selectivity. The financial district always tries to be selective,

* Walter Gutman is an old hand at appraising steel stocks. An analyst for Goodbody & Co., he follows steel trends closely.

At Steel

always realizes that management makes a tremendous difference but this realization will grow keener.

Recently there has been some tendency for speculators to take an unusual interest in the more speculative steel companies, those which were making extra profits by charging large premiums for scarce articles or indulging in package selling of high-priced specialty items. As the enormously expanded capacity of the industry makes its weight felt those companies which were making unusual profits out of the scarcity conditions will begin to normalize their margins and speculators will begin to realize how much fundamentals count.

Test To Come—The real test will come late in 1958 when the present expansion programs are about completed and the industry has 145-150 million ingot tons to offer to its customers. The way it looks now consumption in 1958 won't be over 120 million tons, and may be no higher than the 115-117 million range predicted for this year. A twenty-five million ton surplus of capacity, which is more than England or France ever produced altogether and is about equal to what Germany turned out to prepare for World War II—this is going to be quite a surplus to handle—and it's going to mean a real test of management skills.

Those companies who haven't invested enough in plant modernization to have a good product mix and low cost production could have a rough time—but the aggressively-led companies with modern plants, especially those which are well located, should do well.

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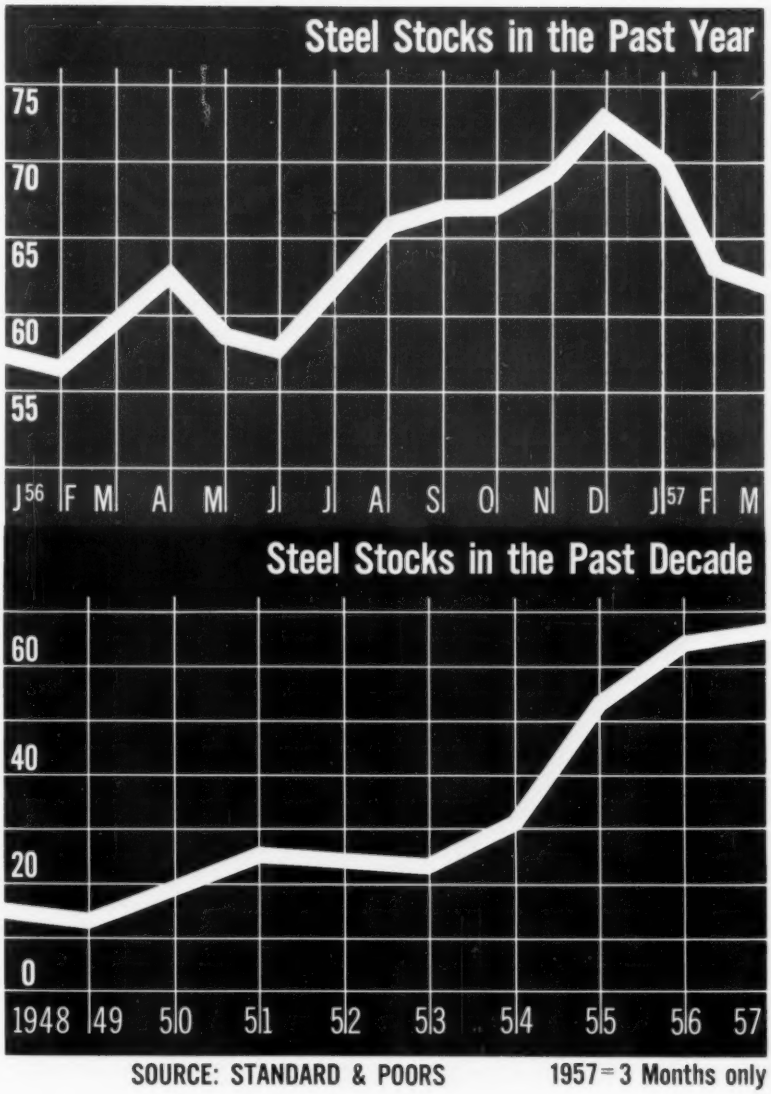
Price Index of 11 Steel Common Stocks (1941-43=10)



SOURCE: STANDARD & POORS 1957=3 Months only

ON WHEELS: Selecting equipment such as lift trucks and the like requires special attention. Mr. Wolf of Dow Chemical Co. advises:

"When selecting this type of equipment, we must consider the condition of the floors, type and size of wheel, and weight of the empty unit."

Power equipment—First, analyze your future operating requirements and compare these with the operating characteristics of the several types of power.

Second, analyze your future needs, if possible, give consideration to the possibility of standardization, maintenance facilities, etc.

Third, compare the operating costs, including depreciation, maintenance, and interest on your investment for the various types of power. Yale and Towne photo.

How to Plan Materials Handling Equipment Purchases

Discussion at National Materials Handling Exposition provides rules of thumb for selecting materials handling equipment.

Knowledge of all types of equipment, its applications and limitations, is necessary for materials handling engineer.

■ With the growing importance of materials handling in manufacturing, selecting the right equipment for specific plant conditions has become a complex job for the materials handling engineer.

This was a major concern of the 20,000 materials handling specialists who visited the seventh National Materials Handling Exposition in Philadelphia last week.

The visitors, sent by some 10,000 companies or industrial divisions to see the latest in equipment, forged through 256 exhibits, a new record for the show.

How to Choose—A record 707 materials handling engineers registered for the series of conferences. Those who heard C. H. Wolf, Dow Chemical Co., got some valuable pointers on the all-important selection of materials handling equipment.

The Fundamentals — Here are some of the fundamentals of materials handling equipment selection as stated by Mr. Wolf, together with pertinent observations:

Production rates—These are particularly vital when handling material in process. "The rate of flow . . . may require that we employ a means of accumulating the product or a single source may have to be divided into several lanes."

Layout — Plant layout will be affected by the building and this in turn will be a big factor in selection of equipment. By the same token, proper selection of equipment can affect plant layout.

Production problems — Production systems also have a habit of changing for various reasons. . . . When selecting equipment, these possibilities should not be overlooked and, in so far as possible, should be planned for.

"For this reason we should always try to select the simplest equipment that will satisfy the immediate job requirements and at the same time be useful in other parts of the system." Mr. Wolf's tips prove useful to metalworking.

Why Steel Prices Are Going Up

Labor Contract Pyramids Employment Costs

Steel companies estimate labor costs will climb 20¢ per hour July 1.

It may mean steel prices will climb more than first estimated. Competition could temper price increases.—By J. B. Delaney.

▪ The steel price increase next July could be bigger than some of the estimates to date.

Best estimate up to now has been $5 to $6 a ton. And competition may force the mills to settle for that amount. But recent comments of steel executives in announcing first quarter earnings indicate the July price boost could be comparable to the $8.50 average increase of last August.

Labor Costs Mount — At least three companies—U. S. Steel, Jones & Laughlin, and National Steel—have said their employment costs will rise 20¢ an hour next July 1 when the second phase of the three-year contract with steel labor goes into effect.

The 20¢ figure includes a basic wage boost of 7¢ an hour, a 0.2¢ increase in the increments between job classes; a rise in holiday and Sunday premium pay; an increase in pension costs, effective Nov. 1; and an expected boost in pay under the cost-of-living clause of the labor contract.

Escalator Goes Up—The c-of-l clause gave the steel workers a 3¢ an hour increase last January, and on the basis of rises in the price index through March, they're entitled to another 2¢ effective July 1. It could be even more. The mills also figure in increased costs of Social Security and other taxes when wages rise.

Under an established formula of 40¢ a ton for each penny rise in employment costs, the 20¢ boost would warrant an $8 a ton steel price increase. This would also cover higher raw material and services costs which the mills usually experience in the inflationary spiral that follows steel price increases.

Blough Noncommittal — Roger Blough, chairman of U. S. Steel Corp., went into the mechanics of the labor cost outlook at a press conference following his company's quarterly earnings report. He declined to estimate how much steel prices would rise, pointing to the possible effect of growing competition in some steel products.

Mr. Blough's outlook on steel for the year is optimistic. He estimates that production will be about the same as in 1956—115 million ingot tons.

Earnings Figures—U. S. Steel's first quarter earnings of $115.5 million set a record for a first quarter. This represented a return of 9.9 pct on all-time dollar sales of $1.2 billion. Mr. Blough attributed the record earnings in part to higher prices.

U. S. Steel's profits represented a 10.9 pct increase over first quarter 1956. Bethlehem Steel reported a net of $53.4 million, up 18.8 pct over $44.9 million in '56. Republic showed a 12 pct gain, with earnings of $28 million versus $25 million in 1956. Jones & Laughlin was off 5.4 pct, and National's earnings declined 4.3 pct.

Steel Earnings—1957 versus 1956

COMPANY	1956 EARNINGS	1957 EARNINGS	PCT CHANGE
U. S. Steel	$104,160,135	$115,478,109	+10.9
Bethlehem	44,963,787	53,427,655	+18.8
Republic	25,041,392	28,052,826	+12.0
Jones & Laughlin	13,559,000	12,823,000	− 5.4
National Steel	14,102,586	13,501,506	− 4.3
Youngstown Sheet & Tube	10,193,856	10,607,267	+ 4.0
Inland Steel	14,015,549	14,613,704	+ 4.3
Colorado Fuel & Iron	4,016,414	4,552,392	+13.3
Wheeling	5,280,000	4,559,000	−13.8
Crucible	3,680,966	3,372,606	−12.4
Pittsburgh Steel	2,469,624	2,011,260	−18.5
Granite City	3,843,801	3,404,451	−11.4
McLouth	2,439,077	3,431,813	−40.3
Barium	1,468,957	2,085,055	+40.2
Allegheny Ludlum	4,572,608	4,790,665	+ 4.8
Detroit Steel	2,178,832	1,008,166	−53.7
Alan Wood	689,172	628,752	− 8.8
Copperweld	971,898	761,667	−21.6
Continental	728,643	662,262	− 9.1
Armco	19,678,979	15,487,752	−21.3
Sharon	2,257,871	1,592,644	−29.5

Powdered Metal Is Ready to Roll

First Copper Strip Mill Almost Ready

Commercial tonnages of copper strip from powder are soon to be a reality.

E. W. Bliss mill nears completion and other U. S. firms are bartering for German patent rights.

Pilot tests reveal other metals are adaptable. Nickel is next in line.—By K. W. Bennett.

■ Powdered metal is moving carefully, but surely, into a new market. A continuous strip plant capable of producing over 50 T. per day of finished strip rolled from powdered metal in a continuous process will begin operations late next spring. The mill is being built by E. W. Bliss. Chemicals Corp. has worked closely in the development.

At least one continuous strip-from-metal powder unit is at the point of purchase stage, with the unit under consideration guaranteed to roll copper strip from copper powder at a cost not exceeding 1.5¢ a lb. Rolling rates of 700 lb per hr have been mentioned. Rolling rights for strip-from-powder are held in Germany, but at least two undisclosed U. S. firms have obtained rolling licenses and a third is expected to enter the field.

Nickel Makes Bid—While attention has been directed largely at copper, other metals have been rolled successfully on pilot lines (first rolling work dates back to the 1920's) and a few are perfectly capable of going into volume production. One of the strong bidders is nickel.

Nickel powder output is expected to climb with increased direct chemical production of nickel bearing ore. Sherritt Gordon Mines, Ltd., is reported to have invested $29,000,000 in its Ft. Saskatchewan chemical reduction properties. Sample quantities of the nickel powder have been rolled into strip, and a potential market for the product has already been proven to exist.

In copper and nickel, the announcements that high purity powder is available in quantity through direct chemical reduction of scrap or ore is partially responsible for the surge of interest in rolling techniques. Other considerations: the Bliss unit can produce copper and copper alloy strip at a reported 20 pct of conventional costs.

How Process Works—The rolling process resembles "double-pressing" of a powdered metal part. Powder drops from a hopper between rollers at an "angle of nip" of 7-8°. The "green" strip is not rolled to full density, but passes through a sintering furnace at about 95 pct density.

As early as the 1940's it was proven that iron powder exposed only several seconds at 1200-1400°C. produced a good sinter. The sinter can then be either hot- or cold-rolled to achieve final density and surface characteristics.

Other metals rolled from powder in test lots include Monel, brass, aluminum, stainless steel, titanium. Nearly all workers conclude their own lists with a guarded, "—and others," so that it is impossible to say that other materials are not being studied.

What's Ahead for Iron Powder?

It's Debatable—At first glance, iron powder would seem to be far down the list of possible contenders for entry in the dawning powder metal sheet and strip market.

For one thing, steel strip is inexpensive and available. It follows that there might not seem to be any incentive to probe the future in this area for iron powder.

Two Advocates—But J. D. Shaw and Walter V. Knopp of SKC Research Associates may have put their finger on a basic element in iron powder's future.

The two lab men told the Metal Powder Assn. meeting:

"The steel companies in their search for additional sources of iron, are spending tremendous amounts of money on direct reduction processes," they point out.

Looking Ahead—"In our opinion, the reason many of the latter are exhibiting such interest in iron powder production in an obviously overcrowded field is that they must anticipate an operation such as rolling metal powders to finished products."

This conclusion, while perhaps a controversial one, could point to the biggest market of all.

Iron Is Easier — At least two major research laboratories and a chemical firm are working on iron powder with an eye to its commercial rolling possibilities. One observer remarked, "Actually, iron will be a simpler metal to work than nonferrous materials."

Solving "parking" problems for river traffic

Our natural traffic arteries, the rivers, today bustle with increasing transportation of all kinds of bulk materials. Efficient "parking" facilities, such as this coal loading dock on the Ohio River are needed to load and unload barges at terminal points. Made up of a series of steel sheet pile cells, filled with sand and gravel and capped with concrete, these docks are low in first cost and need little maintenance. The number, diameter and height of cells is determined by dock size and location as well as variations in river level. Two or three or dozens may be used. Large installations, equipped with barge shifting and unloading machinery, have been constructed to handle as many as sixty barges.

More than 100 docks have been built in the last eight years, another example of Dravo's unique construction experience "in and around water." For more information on docks or any of the products and services listed below, write to DRAVO CORPORATION, PITTSBURGH 25, PENNSYLVANIA.

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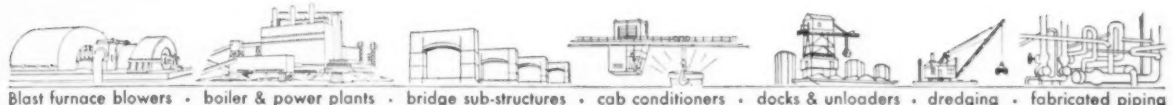

Blast furnace blowers • boiler & power plants • bridge sub-structures • cab conditioners • docks & unloaders • dredging • fabricated piping

foundations • gantry & floating cranes • gas & oil pumping stations • locks and dams • ore & coal bridges • process equipment • pumphouses & intakes

river sand and gravel • sintering plants • slopes, shafts, tunnels • space heaters • steel grating • towboats, barges, river transportation

Giant Press Speeds Stamping Job

▪ Valued at three quarters of a million dollars, Clearing's biggest transflex press is going to General Electric Co., starting next week, via more than 20 flatcars.

It's job for GE: stamping out appliance parts at a 12 per minute clip. By automatically moving a work piece through 7 or more stamping operations, the giant Clearing press allows a major inventory reduction in semi-finished stamping blanks.

For a unit designed to speed the already high speed appliance production line, the Clearing press is big—58 ft wide and 42 ft high. Yet this heavy press incorporates what is believed to be the first flexible speed mechanism. The single press (actually a modular construction that involves 15 stations and 2 joined press units), can produce alternate production run of two different pieces without changing dies.

Push Button—In practice, the operator merely presses the button to switch from stamping of home washer tops to stamping of home laundry drier tops. The big press does the rest of the changeover automatically. The press holds the two sets required for the two appliance parts and selects the set of dies called for. At the same time, it adjusts the slide positioners along its bed which carries the work piece from station-to-station, through the composite press.

There are 9 die stations, 7 used in washing machine tops production and 6 for home drier tops production.

Operation Details—Press feed is automatic. A crane loaded hopper feed brings in enameling sheet blanks into stamping position. The press has two press crowns and two beds joined by a common "Siamese" upright. Separate drives are provided for each crown and the press is rated at a 600-ton unit.

Clearing is tackling the high speed, highly automatic stamping problem with a bigger press than any seen to date. For Clearing, this seems a definite future trend. Already in action in a West Coast aircraft plant is another automated giant, using split beds to achieve higher speed die changes. A similar unit has been ordered by the auto industry, where third shift die changes are a nightly necessity. The next die called for is set up on the idle portion of the bed.

Criticism Answered — Criticism that presses of this size, with the additional bed space required, would use too much plant floor space is met directly by Clearing with the argument that the big press allows storage of dies at the press —not somewhere in the plant.

MACHINE GUNS: Lockheed Aircraft Corp. uses guns for constructing airplanes. The modified rifle shoots a charge into an explosive forming die to form expanded parts from steel tubes. Pistol with the muzzle device is a stud driver converted to punch soles in super-hard metal.

New Alcoa Lab Site

Aluminum Co. of America has taken options on a large tract of land near Merwin, in Westmoreland County, Pa., to build a new development and research center. Area was selected because; (1) availability of almost 2000 acres of land, and (2) it is only 8 miles from New Kensington, current site of Alcoa's laboratories. This means little or no change of personnel will be required.

The company has not yet decided on types or numbers of structure that are needed, and as yet there are no detailed building plans.

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Annealing Furnaces

For your smaller orders, requiring special annealing cycles, the flexibility of Swindell Single Stack Furnaces operates to particular advantage. Handling loads up to 70 tons, these Swindell units provide controlled location of heat input—exactly where it is needed. *Write us for the facts.*

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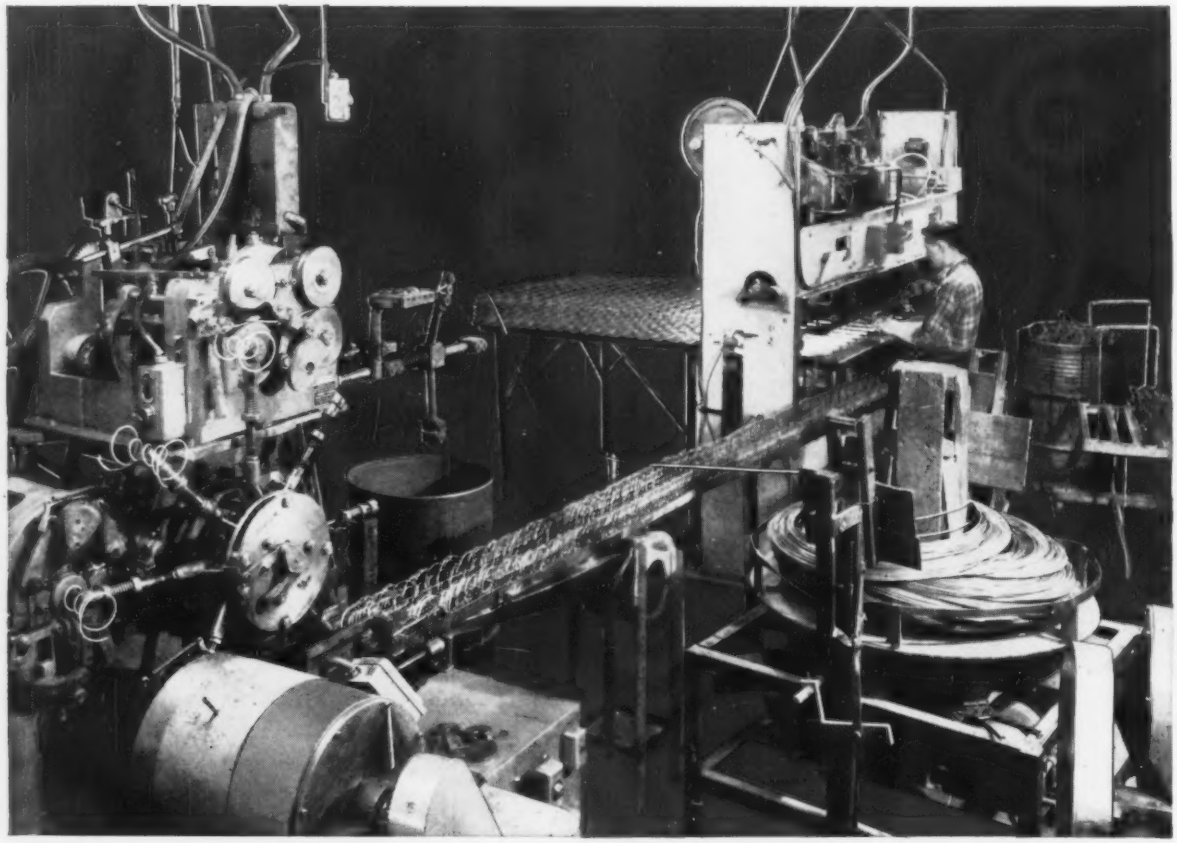
Double cone springs are produced automatically on this Wunderlich special high speed automatic coiling and knotting machine at the Ohio Mattress Company, Cleveland, Ohio. Machine coils, crimps, knots and heat treats springs made from 13½ gage Mastercraft spring wire, supplied in 600 lb. bundles.



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speeds spring production

J&L spring wire reduces number of rejects, increases production, in modern automatic operations. One reason is that every bundle of spring wire is produced to closely controlled tolerances.

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Try this superior Jones & Laughlin spring wire. You'll find it's tops in quality, competitive in price.

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Jones & Laughlin STEEL ... a great name in steel

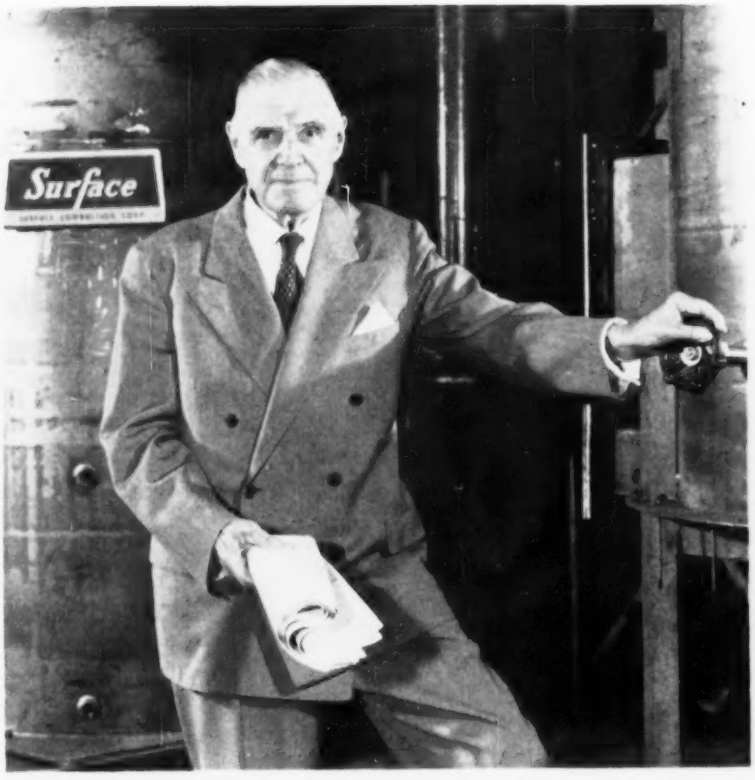
Ernest G. de Coriolis

Getting Teamwork Into Research

At 75, Mr. de Coriolis can speak of the do's and don'ts of research with authority.

For a quarter century he made applied science pay off at Surface Combustion Corp.

A research team needs many ingredients, but most of all, it must have the spirit of adventure.



Ernest G. de Coriolis: A research team needs encouragement.

▪ Getting the best results from research requires teamwork, almost any research man will tell you. It sounds good, but how do you get teamwork? One answer lies in the example set by Ernest G. de Coriolis, staff research consultant at Surface Combustion Corp., and winner of the 1956 Trinks Industrial Heating Award. He helped put gas chemistry on the map.

Back in the days when "teamwork" meant playing a ball game to most of us, Mr. de Coriolis was organizing a research team that he was to lead through the industrial heating industry's biggest 30 years.

Defines Goals—The qualities he has that makes his team a winning one are described by Frederick H. Adams, Surface Combustion's president, as clarity of purpose, organizational ability, determination, and the ability to inspire. "The clarity of purpose with which he led his group, the determination which he inspired . . . led to better industrial processes, better furnaces and controls," says Mr. Adams.

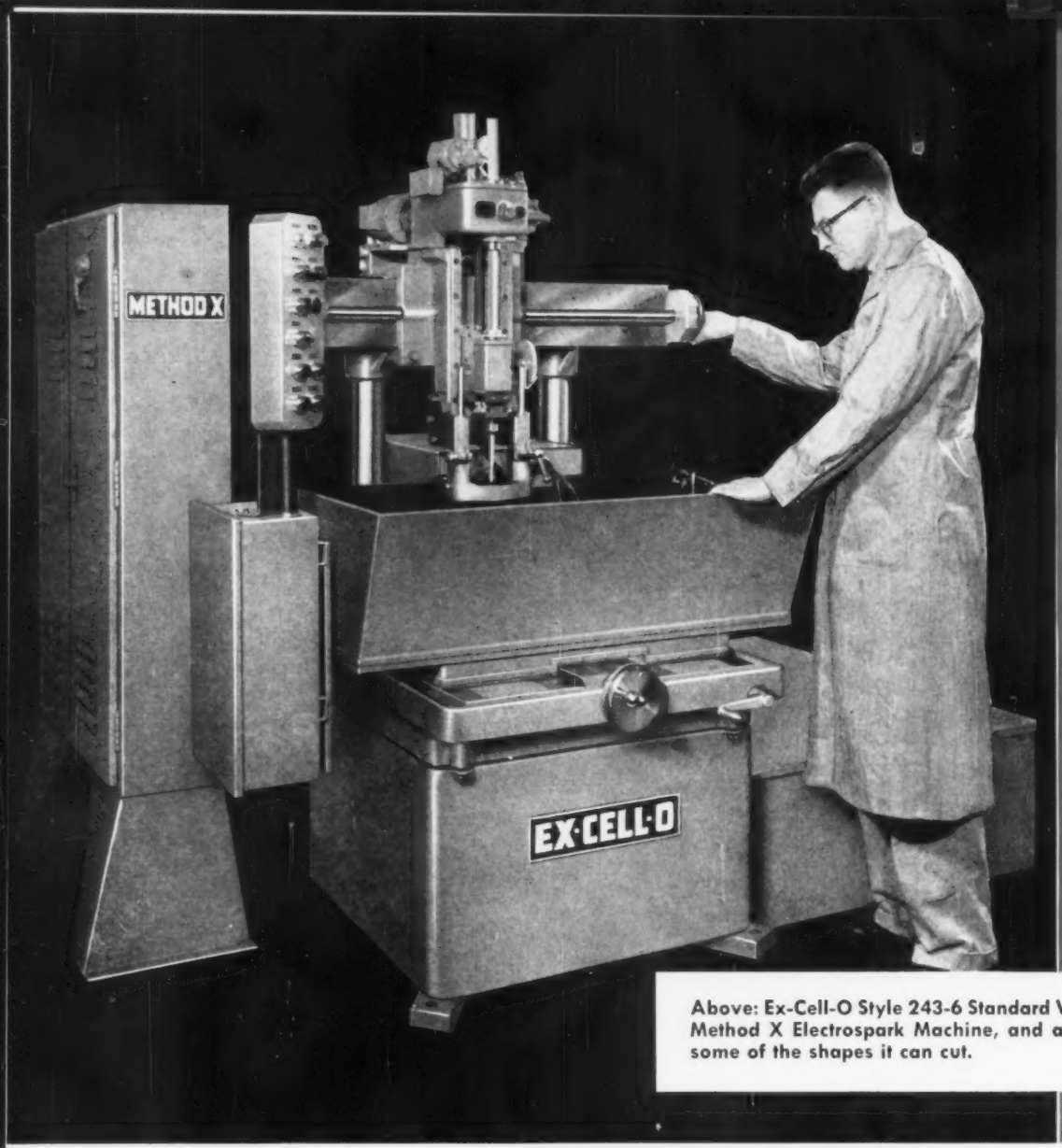
Knowing where you are going is only one part of the answer. Mr. de Coriolis picks his engineers and scientists carefully. After getting them started on their projects, he works along with them and encourages them. His staff refers to him as the "Deke."

Plans Logically—He has to his credit a score of important patents in the industrial heating field. What his way of operating has achieved can perhaps be best understood by tracing the logic of his plan through the years.

In 1928, as director of research at Surface Combustion, he was concerned primarily with the reactions between furnace atmospheres and the surfaces of metals requiring heat treatment. This work was extended to include most common gases which led to control of gaseous carburizing of steel.

Dare Mighty Things—Then came the introduction of atmosphere gas generators and controllers.

Along the way, Mr. de Coriolis was made a Fellow by the American Society of Mechanical Engineers. Perhaps the most important cue to success in research is found in a quote by Theodore Roosevelt that has been displayed over the "Deke's" desk for 25 years: "Far better it is to dare mighty things to win glorious triumphs, even though checkered by failure, than to rank with those poor spirits who neither enjoy much nor suffer. . . ."



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Above: Ex-Cell-O Style 243-6 Standard Vertical Method X Electrospark Machine, and at right, some of the shapes it can cut.

NEW! Electrospark Machine FOR TOUGH METALS

Sintered carbides and super alloys—in growing demand these days—are costly to machine, and even more costly to scrap. But you can now machine metals of extreme hardness and toughness easily and economically.

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57-38

Buying Power Takes a Downturn

For the first time in 2½ years, factory workers see their take-home pay buy less than it did the year previously.

Shorter work week and rising costs of goods and services take their toll.

▪ Consumer income is taking its cue from some of the other economic indicators. Although total employment continues at a record level, higher prices and a less frantic rate of production are taking their toll on take-home pay.

Cutting back of overtime in some of the major industries and even going to a shorter week in some of the spotty segments have resulted in fewer hours nationwide.

Earnings Down—In terms of income, the Dept. of Labor says factory workers' spendable, or after tax, earnings declined from February to March. This puts the average weekly take-home pay at $74.65 for a worker with three dependents. This is up from $72.25 a year ago, but down 30 cents from the February figure.

To make matters worse for the factory worker, prices of goods and services also climbed during the month. This cut further into his buying power.

Buying Power Hit—While spendable earnings are 3.5 pct higher than a year ago, amounting to a gain of $2.35 a week, buying power is slightly lower this year than at the same time in 1956. The Labor Dept.'s index of "real" spendable earnings was at 121.5 in March, compared with 121.9 in March, 1956. This also shows a decline from 122.3 in February, of this year. (These index figures also apply to a worker with three dependents.)

The significant point to remember is that this downtrend in March is the first in more than 2½ years in which the real spendable earnings showed no gain from the same period a year ago.

Inventory Cutbacks Take Effect

Following the Leader—Inventory levels, which generally lag behind the changes in the economy, are finally showing some signs of leveling off in tune with other business "plateaus."

In 1956, book value of manufacturing and trade inventories climbed at a rate of over $500 million a month. In recent months, the increase has been as low as $100 million.

Reduction in rate of inventory gain has taken place for the most part in durable goods industries. This is no news to steel and other basic materials industries which have blamed much of their recent sales slumps on customers' inventory control.

Sales-Stocks Ratio Improves—The Dept. of Commerce points out that as a result of a moderate improvement in sales and the slackened rate of inventory rise, durable goods stock-sales ratios are down slightly from last fall. They are still above a year ago, however.

Reductions in inventories in the durable goods industries occur in electrical machinery, motor vehicles, fabricated metals.

In the primary metals, non-electrical machinery and aircraft industries, the uptrend in inventory accumulation continues. But these groups also comprise four-fifths of industry's unfilled orders. So inventory for these industries in the face of over $5 billion in unfilled orders is largely academic.

Rain Helps Implement Makers

Been Wrong Before—For many months, it's been the fashion to predict better things for the farm implement industry. But just as frequently, with the exception of a mild upturn in late 1956, these predictions missed the mark.

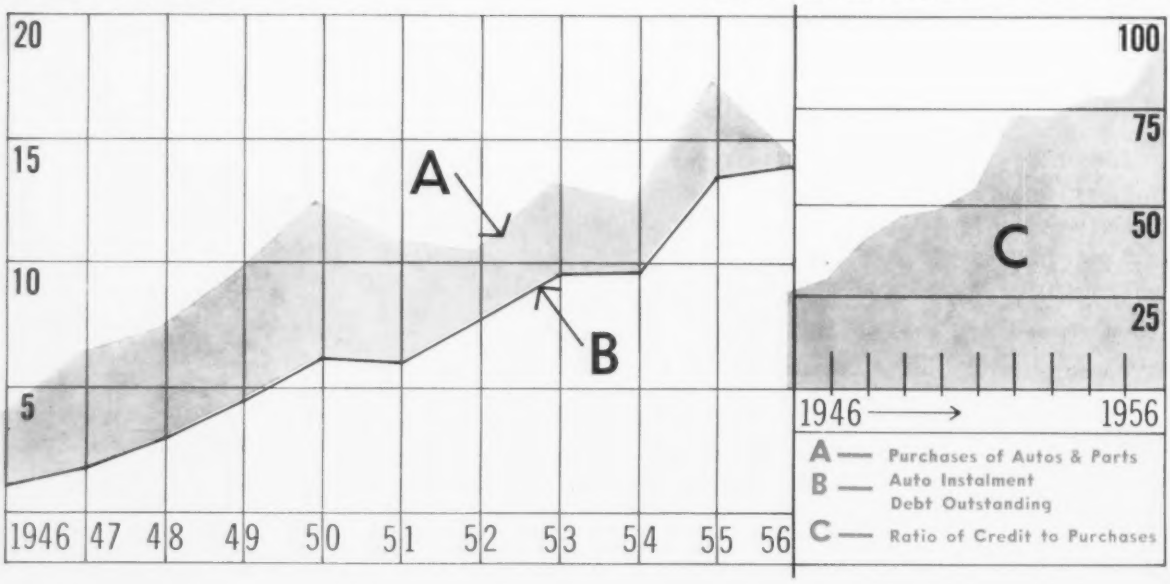
Now there's a new reason for hope. Behind the headlines of disaster from Texas floods is the ray of hope that the long period of drought in the Southwest may be broken.

It may be too early to place too much hope in a significantly better year for the makers of farm machinery. But at least there's more to go on than in the past year.

It's hope for the drought areas that has the most realistic sound. If these farmers intend to stay on, they will need to come into the market to rebuild their outworn or outmoded tools. Whether they can get the credit is another problem.

In Billions of Dollars

Source: Mellon National Bank and Trust Co.



Auto Credit Approaches Auto Purchases

Why Auto Sales Are in a Slump

A large segment of the auto buying public apparently has over-extended itself.

They are still paying for their 1955 models on a 36-month credit deal.

But while the effect of easy credit is catching up with the industry, so are higher prices.— By T. L. Carry.

▪ How much have credit restrictions cut down on the sale of new cars? Probably not as much as some people would lead you to believe, but more than the automakers care to admit.

For an accurate answer, it is best to compare the credit situation as it was in 1955 to what it actually is today.

Discounts Common—Two years ago, people couldn't seem to satisfy their need for cars. The market was booming and pressure was on the dealers to sell all they could. At the same time, it was a comparatively easy matter to buy a car on credit.

It was a common practice in those days for a dealer to discount a car and for the finance company to accept the discount as part of the down payment.

Everyone was Happy — Here's how it worked: suppose a customer wanted to buy a car listed at $2800 but only had $200 in cash for a down payment. The dealer would discount the car $400 and thereby raise the customer's down payment to $600. The $2200 balance would be financed for 36 months. The dealer would make $200 on the deal because the balance was just the price he paid the factory for the car.

Everybody was happy under the arrangement. The finance company had its minimum down payment, the dealer made less money but sold more cars and the customer had a brand new car to drive.

Policies Change—It is not the case this year. The majority of loan companies will no longer accept discounts as part of the down payment and the reasons are obvious. Finance companies have to pay more for the money they loan and thus are more particular about how and where they loan it.

It is also interesting to note that 36-month contracts are the exception this year rather than the rule.

Debt Load Grows—Loan companies insist on shorter terms and so do the dealers. They now know that a 3-year contract keeps a customer out of the market too long.

In 1955, consumers spent $17.1 billion for autos and parts—an all-

How Great Lakes Steel *inspects scrap* quality

Two things don't belong in this gondola—and a team of trained Great Lakes Steel scrap inspectors is searching them out. The intruders are *non-ferrous material* and *high sulphur content ferrous material*, which contaminate heats and spoil the quality of finished steel.

Additional visual inspection in the stockhouse and on the open-hearth floor, magnetic screening, and weight checks all combine to detect and eliminate these adulterants, before the scrap is fit to become a part of Great Lakes steel.

Sound like a lot of trouble? It's worth it, to us and to our customers. And it's just one more step in Great Lakes Steel's continuing program of quality control that assures you the finest steels. Make it a point to contact your Great Lakes Steel representative for the rest of the story. He's as close as your telephone.

Here approved scrap, in charging boxes on buggies, heads for the open hearths. Quality scrap gives finished steel improved surface and ductility characteristics.

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There's a Good Reason why

ZINC DIE CASTINGS

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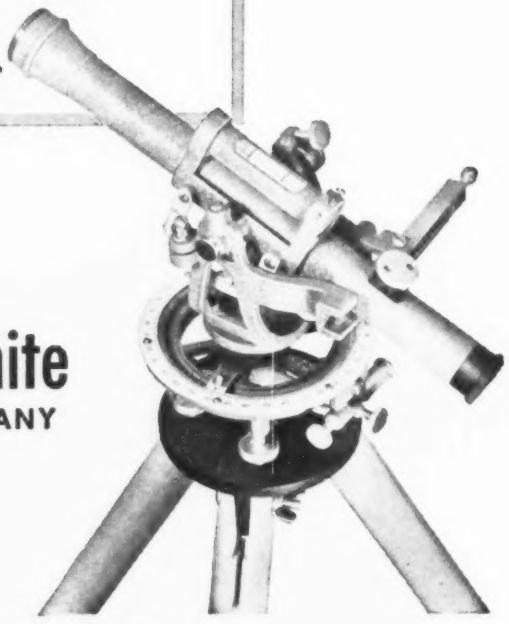

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You may never need a theodolite, but you will recognize the importance of accuracy in this surveying instrument. This is the tool that enables engineers to build bridges and tunnels from both ends and make them meet exactly in the middle. It also helps surveyors lay out highways and property lines. Any instrument demanding such precision must be made of very accurate parts. ZINC Die Castings are meeting that need.

Engineers at David White Instrument Company have a strong preference for ZINC Die Castings because of the consistent accuracy and other physical and mechanical properties required in their transits and levels. They find that zinc has greater resistance to shock than metals formerly used. ZINC Die Castings are also much less expensive for quantity production and greatly reduce the assembly and finishing problems.

Many manufacturers are recognizing the important quality of ACCURACY that can be obtained with ZINC Die Castings. Any die caster will show you samples of such precision work done for his customers. It may be that these examples will suggest improved qualities and cost savings for your products.

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The research was done and the Zamak die casting alloys were developed with

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Automotive Production

WEEK ENDING	CARS	TRUCKS
May 4, 1957	121,811	25,088
April 27, 1957	123,633	24,625
May 5, 1956	112,705	22,688
April 28, 1956	127,189	21,954
TO DATE 1957	2,411,298	395,974
TO DATE 1956	2,381,796	430,177

*Estimated. Source: *Ward's Reports*

time record. At the end of the year, auto instalment debt totaled $13.5 billion. But in 1956, while purchases dropped to $14.6 billion, instalment debt rose to $14.4 billion.

High Prices Hurt—Still, loan companies insist that they have money available for new car financing and the dealers agree with them. They also point out that the number of customers rejected for poor credit has not increased noticeably over 1955.

They don't deny that tighter restrictions may have cost them a few sales but they believe that the real cause of the lag is the high price of the new cars.

Down Payment Handicap—Finance companies are quick to point out that percentagewise, the down payment requirement for new cars has not increased over what it was in 1955. Most firms still require from 25 to 33 pct as a minimum.

However, the actual cost of cars has steadily increased and the amount of dollars and cents a customer has to lay on the line has also gone up.

Many people don't have the money needed to buy a new car. If they have an older model, the chances are that there is not enough equity in it because of the loose practices of 1955.

Try A Used One—But a dealer, once he has a live prospect in his show room, does his best to hang onto him. Thus, if it becomes obvious that a man cannot afford a new auto, he is shown a used model that fits his needs. This is the main reason that the used car market has held up so well.

It bears out a theory that some dealers have been expressing for a long time. If the price of new cars doesn't stop going up, there may soon only be a market for used cars and cheaper European models.

Truck Output Hit Peak in April

Predictions are that truck production probably hit a 13-month high during the month of April. Automotive News estimates that 105,244 trucks were made last month. This is 18.2 pct above March output and 7 pct above production in April of 1956.

There are many reasons for the increase, although none of them seem to indicate a spurt in sales.

First of all, several makers have just introduced some new models. They were involved in changeovers during March. Secondly a strike at the Eaton Manufacturing Co., a prime supplier of truck axles, seriously curtailed some production.

R. C. Woodhouse, sales manager for GMC Truck & Coach Div., says that the company's sales for the first 20 days of April were 15 pct higher than they were for the same period in March. Mr. Woodhouse adds that the industry normally looks for only a 10 pct gain in April over March.

P. J. Monaghan, division general manager, believes that, if the industry follows the same pattern as his division, chances are that the volume of truck sales this year will be close to the 1956 level.

White Is in Demand

A survey by Chrysler Corp. shows that the most popular automobile color in use this year is white, either in single tones or in combination use. So far this year, 26 pct of Chrysler's cars were painted white.

Surprisingly, black is still a favorite with a lot of buyers and occupies the number two position this year.

Virgil M. Exner, Chrysler's director of styling, says that the sculptured shapes of the 1957 cars are responsible for the trend to quieter colors. The shape of new autos no longers makes it necessary to emphasize bright paint.

THE BULL OF THE WOODS — **By J. R. Williams**

THE BULL O' TH' WOODS USED TO BE ONE O' TH' BEST FITTERS IN ANY O' THESE BIG SHOPS-- HE WAS FAMED FOR IT AROUND HERE! BUT NOW HE CAN'T GRIND A HURTIN' LUMP OFF OF HIS NEW FALSE TEETH!
WHO CAN? YOU GET TH' PLACE LOCATED WITH YOUR FINGERS AN' BY TH' TIME YOU GET IT OUT TO WORK ON IT, YOU'VE LOST TH' PLACE BUT DON'T THINK YOU HAVE-- AND YOU SOON NEED A NEW PLATE!
JRWILLIAMS
THE FALL OF THE FAMOUS
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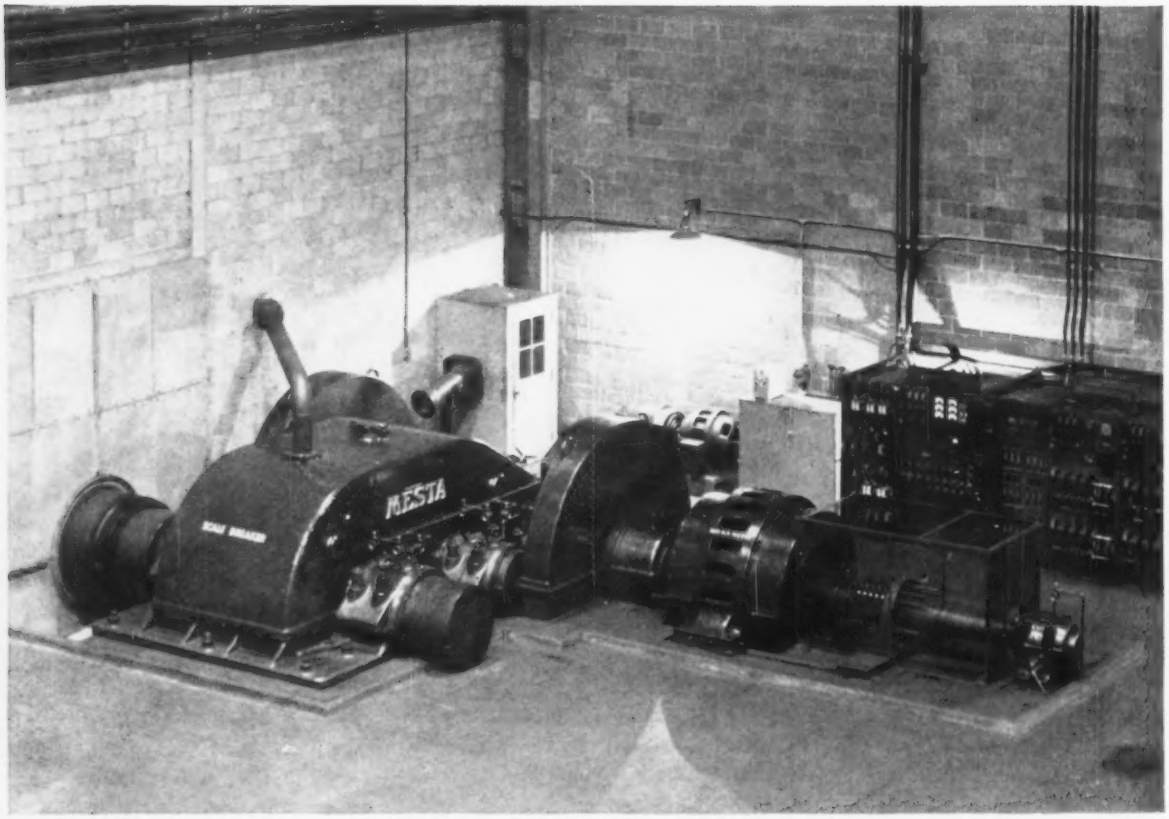

How Meropa EP Properties Protect Heavily Loaded Gears

TEXACO MEROPA LUBRICANT contains special extreme pressure properties that give it a lubricating film of greater toughness. It means full protection for heavily loaded gears and bearings.

Polar additives in *Texaco Meropa* keep it clinging to metal surfaces even under shock loads, or severe conditions of heat, pressure or moisture. And it won't thicken or foam. It's non-corrosive to gear and bearing metals—is stable in use, storage or centrifuging. These are some of the reasons why *Texaco Meropa Lubricant* keeps gears running smoother and longer, and helps keep maintenance costs low.

There is a full line of Texaco Lubricants available to help you get top performance from all your equipment. A Texaco Lubrication Engineer will be glad to suggest the best ones for your needs. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write:

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TEXACO Meropa Lubricants

FOR STEEL MILL GEAR DRIVES

Fight Looms on Fast Write-Offs

Administration Calls It a Useful Tool

Advisors believe the fast tax write-off is a valuable tool in changing world.

Basic authority is needed, administration contends, even though little fast tax aid is being granted.—By G. H. Baker.

▪ Keep in mind that while fast tax amortization is down, it is not out. The Eisenhower Administration wants to hang on to its basic authority to authorize fast write-offs, although at present very few certificates of necessity are being issued.

In the Senate, Chairman Harry Byrd, D., Va., of the influential Finance Committee, is calling for a new law which would rigidly confine future fast write-offs to direct military, atomic, and research programs. No "defense-related" projects could qualify for fast write-offs, under the Byrd proposal. He argues that the Treasury has lost much revenue because of fast write-offs.

Administration Opposes — But there is more opposition to Mr. Byrd's plan than meets the eye. The Administration's mobilization planners are quietly asking congressional leaders to refrain from killing the program.

Trust us, they say, to exercise judgment and moderation in operating the program. More important, they are telling Congress, the existing authority to permit fast amortization should be kept in mothballs so that any part of the program can be quickly put into use if needed.

Useful Tool—Says Gordon Gray, the director of the Office of Defense Mobilization and boss of the tax-amortization program: "In the kind of unsettled world we live in, fast amortization of defense facilities is a useful tool. It would be a mistake to drop it."

State May Push U. S. Into OTC

The chances that the United States will join the tariff-cutting Organization for Trade Cooperation (OTC) this year are dimming. But the tariff issue is very much alive. The State Dept., annoyed with the refusal of Congress to authorize U. S. membership in the OTC, threatens to put the U. S. in by its own executive action.

OTC, a global organization which exists so far only on paper, won't actually start functioning unless or until—the United States joins up. Congress thus far has refused to join despite presidential urging.

Lead, Zinc Get Stockpile Reprieve

Long-Term Program Needed—Lead and zinc purchases by the government, an important prop under the minerals producing industry, will continue, at least for several more months.

Gordon Gray, head of the Office of Defense Mobilization, says purchases of lead and zinc for the stockpile will continue at least until the Interior Department presents —and Congress considers—a long-term permanent program to bolster the mineral-producing industries.

Minimum Goals Reached — An earlier statement by an Interior Department official that lead and zinc buying is due to end "in a matter of months" could still be true. But Mr. Gray indicates he believes it will continue for some time under the present month-to-month buying policies, or under the new long-range minerals program.

The government has filled its "minimum" stockpile of lead and zinc, but has not yet reached its goal on the "long-term" stockpile.

Barter Resumes—Mr. Gray also indicates that the program of bartering surplus agriculture supplies for foreign minerals, including lead and zinc, will be resumed.

However, an Agriculture Department spokesman indicates that when the barter program is resumed, it may be on a reduced scale.

No Nickel to Stockpile — All nickel produced during 1957 will go to private industry. The government has decided not to buy any of the scarce metal this year.

Officials of the Office of Defense Mobilization have extended throughout the year a policy first announced last fall suspending stockpile purchases of nickel for the first six months. Although stockpile purchases are not revealed, it is believed that the suspension will mean more than 100 million lb of additional nickel is being made available to industry.

If you're in a hole . . .

BECAUSE OF GRINDING WHEEL PROBLEMS, there's an easy way to get back on top of the situation. Switch to CINCINNATI (PD)° WHEELS. *Now* CINCINNATI Grinding Wheels offer POSITIVE DUPLICATION—a remarkable achievement in precision manufacturing and quality control that can *save you money . . . and* increase your production.

It doesn't take any digging to find out *why* everybody's talking about (PD) WHEELS. Through the CINCINNATI (PD) Manufacturing Process you are assured Positive Duplication of the original wheel *every* time you reorder. "On grade" with a CINCINNATI (PD) WHEEL means all future (PD) WHEELS will act and grind exactly alike.

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So, if you want back on solid ground again, see your CINCINNATI Grinding Wheels Distributor. He'll be glad to explain how (PD) WHEELS can save you money and increase production. Or, contact us direct and we'll send one of our representatives—men who know grinding and grinding machines as well as grinding wheels. Write, wire or telephone Sales Manager, Cincinnati Milling Products Division, Cincinnati 9, Ohio.

Remember—*only* CINCINNATI Grinding Wheels give you

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A PRODUCTION-PROVED PRODUCT OF THE CINCINNATI MILLING MACHINE CO.

Seller's Roadmap Is Handy Aid

As New Prospects Open for Business

Suppliers of metalworking goods and services can use this checklist of new and expanding firms in the West.

It's a handy guide to those worth a sales call.—By R. R. Kay.

■ "Open For Business" signs appear every day on West Coast metalworking plants.

And there's no getting away from this bone-hard marketing fact: Biggest bulk of new buyers and users of metalworking's goods and services are in California. Here's the state's latest list of new and expanding plants — all good prospects:

From Jets to Machinery—Marquardt Jet Laboratories, Van Nuys —jet engines and accessories; Moore Dry Dock Co., Oakland—$6 million for new shipbuilding and repair facilities; Sierra Drawn Steel Corp., Los Angeles—cold finished steel bars; Strike Laundry Machinery, Los Angeles—laundry extractors and tumblers.

Pacific Full View, Los Angeles —aluminum-framed sliding glass doors; Mercast Manufacturing Co., La Verne—frozen mercury castings; Jeffries Transformer Div. of Zinsco Electrical Products, Los Angeles—transformers.

Industrial Products Div. of Hall Scott, Inc., Berkeley — jet engine pumps, gears, and helicopter transmissions; Jamison Manufacturing Co., Los Angeles — school playground equipment; Brown-Jordan Co., Pasadena — metal furniture; Superbo Mfg. Co., Los Angeles—water heaters.

Essick Manufacturing Co., Los Angeles — construction-industry equipment; Westmont Manufacturers Corp., North Hollywood—aircraft parts.

To Computers and Trailers—J. B. Rea Co., Santa Monica—computers, and aircraft and guided missile controls; Parker Aircraft Co., Los Angeles—hydraulic and fluid system components; Microdot, Inc., South Pasadena—coaxial connectors, cables.

Formost Aluminum Windows, Oakland; Triplett Electrical Instrument Co., Oceanside — electrical measuring and test equipment; American Trailer & Mfg. Co., Downey — industrial, commercial, and boat trailers; West Coast Fastener Corp., Gardena — fasteners; Haskell Engineering & Supply Co., Bassett—hydraulic and pneumatic equipment.

Diecastings and Truck Beds—Kolster's Tool and Die, Oakland—diecastings; Vietsch Engineering Co., San Leandro — commercial waste disposal units.

Custom Mechanics, Inc., San Leandro — truck beds; Bostrom Metal Products, Oakland — sheet metal shop; Gardner Neon & Ignition Transformers, Inc., Oakland—electrical transformers; Ferrous Metals, Inc., Berkeley—metallic hardeners and compounds; Pacific Division of Bendix Aviation Corp., North Hollywood—guided missile components.

DEATH FOR ECHOES: Acoustics research and testing in connection with jet aircraft program at Convair Div. of General Dynamics Corp., San Diego, take place in this anechoic (echo-free) chamber. Walls, floor, and ceiling are lined with glass fiber shaped into oddly-patterned wedges.

Here's how Bearings, Inc. helped a customer save $2,000 in 60 days!

By removing bearing inventories from several departments to one centrally located stockroom, establishing records showing every application for every bearing, the bin number where these bearings are stocked and the quantity on hand, our engineers saved our customer money and made all bearings immediately available. Many identical bearings bought by several departments for many types of machines were found in quantities exceeding normal requirements. Many bearings were unuseable — unwrapped, dirty and rusty. A few of these bearings are shown above with W. J. Lukach, Bearings, Inc. sales engineer who supervised cleaning, greasing and re-wrapping all bearings not in original boxes.

THE PAYOFF OF OUR SERVICE, ACCORDING TO OUR CUSTOMER, EMPIRE STEEL CORPORATION AT MANSFIELD, OHIO, WAS A SAVING ON BEARING PURCHASES OF $2,000 IN LESS THAN TWO MONTHS.

This is not an isolated example of our services — surveys of bearing requirements, inventory control, application engineering, maintenance schedules and procedures are a regular and continuing part of our service to all customers to whom we supply replacement bearings. Ask how we can help YOU!

Providing bearing service in the territories adjacent to our branches, listed below.

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OHIO: Akron • Canton • Cincinnati • Cleveland • Columbus • Dayton • Elyria • Hamilton • Lima • Mansfield • Toledo • Youngstown • Zanesville
INDIANA: Ft. Wayne • Indianapolis • Muncie • Terre Haute
PENNSYLVANIA: Erie • Johnstown • Philadelphia • Pittsburgh • York
WEST VIRGINIA: Charleston • Huntington • Wheeling
NEW JERSEY: Camden • **MARYLAND:** Baltimore
DELAWARE: Wilmington •
Subsidiaries: Balanrol Corp. • Buffalo, N.Y.•
Kentucky Ball and Roller Bearing Co. • Louisville, Ky.

Detroit Poses a Blockbuster

Automakers Demand More Standardization

Redesigned auto parts are obsoleting current equipment too soon, say automakers.

Detroit wants complete standardization of building block machine tools.

Whether builders will go along is questionable. Would require complete machine design agreement.—By E. J. Egan, Jr.

▪ The automobile industry has a real project for designers of in-line, transfer machining setups. Auto makers want complete standardization in the "building block" units used to make up transfer machines —uniform bases, columns, machining heads, motor-drive mountings and control elements.

This isn't just something Detroit thinks would be "nice" to have. Unitized, standardized building blocks are considered desperately needed weapons.

To Cut Tooling Costs—What's the fight? It's a grim struggle to reduce the cost of production equipment obsolescence. Every year millions of dollars worth of perfectly good machinery is junked simply because it can't be adapted to make redesigned auto parts.

Whether machine tool builders will buy the idea is questionable. It's not altogether new to them. A few have taken steps in this direction, but with their own ideas of standard sizes and shapes. What the automakers propose would take an industry-wide agreement on a million and one details.

Automan Tells Builders — Machine tool engineers got the story first-hand at the 21st Annual Machine Tool Electrification Forum, sponsored by Westinghouse Electric Corp. The automaker's case was presented by J. F. Randall, director, manufacturing engineering office, Ford Motor Co.

Mr. Randall estimated cost of obsolescence to the automotive industry over the past three years at $320 million. About $80 million was value of facilities prematurely retired. The remainder, about $240 million, went to rework existing machines, and to buy new ones, to handle design changes.

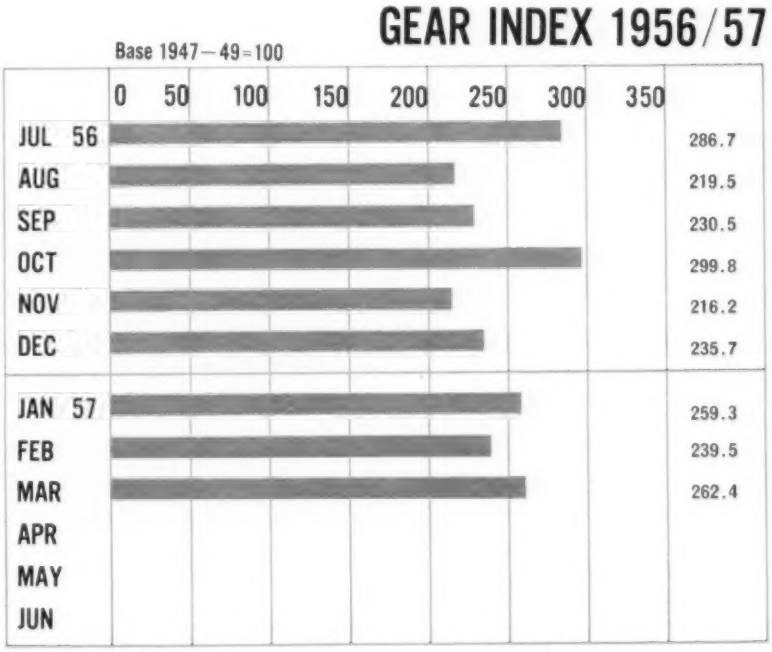
Building Block Solution—That's big money even to the auto people. And they consider it unnecessary expense. The building-block concept is considered the solution.

It does look like a good idea, from the auto industry's point of view. It would permit units to be added, removed, or interchanged with other units on an in-line machine to handle design changes.

And Mr. Randall sees two ways automakers can use building blocks that may be removed from an in-line setup.

Dial - Type Also—Many parts don't lend themselves to production on in-line machines. But they may be "naturals" for dial-type machines. Building block units could be spaced out surrounding an indexing table, to create a dial-type setup.

And, where general-purpose machines are needed, automakers could simply add a table to one of the original building-block components.



Source: American Gear Manufacturers Assn.

INDUSTRIAL BRIEFS

Travel in Class—The first tourist-class luxury liner in the U. S. will be constructed by Ingalls Shipbuilding Corp., Birmingham, Ala., at its Pascagoula, Miss., shipyard. Ingalls has signed an agreement with the Martime Administration to convert one of the Mariner type ships into an air-conditioned 900-passenger luxury vessel. The ship will be leased to the American Banner Lines, Inc., and will travel from the U. S. to northern Europe.

A Few Words About Texas—The Sheffield Div. of Armco Steel Corp. celebrates its 50th anniversary of the manufacture of the first openhearth steel ever made in Texas, and also, the production of the 10 millionth ton of steel by the Houston mill. During a brief span of 15 years, the Sheffield mill has grown from a capacity of 200,000 to 1.2 million tons. It has produced enough steel to build two complete fleets the size of the U. S. Navy.

Names Not the Same — The name of Union Carbide and Carbon Corp. has been changed to Union Carbide Corp. Three divisions of Union Carbide have also been changed. Carbide and Carbon Chemicals Co. to Union Carbide Chemicals Co.; Linde Air Products Co. to Linde Co.; and Carbide and Carbon Realty Co. will be known as Union Carbide Realty Co.

Blow Up a Storm—A $4.5 million contract has been awarded to Pittsburgh-Des Moines Steel Co., Neville Island, Pittsburgh, by the U. S. Army Air Force. Contract is for construction of three removable wind tunnel test sections at Arnold Engineering Development Center, Tullahoma, Tenn. The company is also a low bidder on the completion of two coolers for the supersonic wind tunnel. Units will be utilized to cool the air in the supersonic circuit.

Caustic Comment—Olin Mathieson Chemical Corp.'s Industrial Chemicals Div. will market all the chlorine output of the chlorine-caustic soda plant being constructed by Kaiser Aluminum & Chemical Corp. at Gramercy, La. Scheduled for completion this fall, the plant will have a capacity of 100 tons per day of chlorine and equivalent caustic soda.

Reactor Reaction — Westinghouse Electric Co. will proceed with the construction of a testing reactor, designated WTR, which was delayed late last year. The reactor will be constructed at Waltz Mill, Pa., and will be the sixth major atomic power installation Westinghouse operates in the Pittsburg area.

Close the Shaft—Operations of U. S. Steel's Frick District Palmer Mine will close on June 28, 1957, with complete exhaustion of the mineable coal. The mine opened in 1908 and has produced in excess of 16 million tons of high-grade metallurgical coal for civilian and defense requirements.

No. 1 Scholarship — A new scholarship, to any accredited college or school in the U. S., has been established by the Philadelphia Chapter, Institute of Scrap Iron & Steel, Inc. Preferential consideration will be given to worthy students on the basis of financial need. No restriction is placed on selection of schools as long as it is located within the U. S.

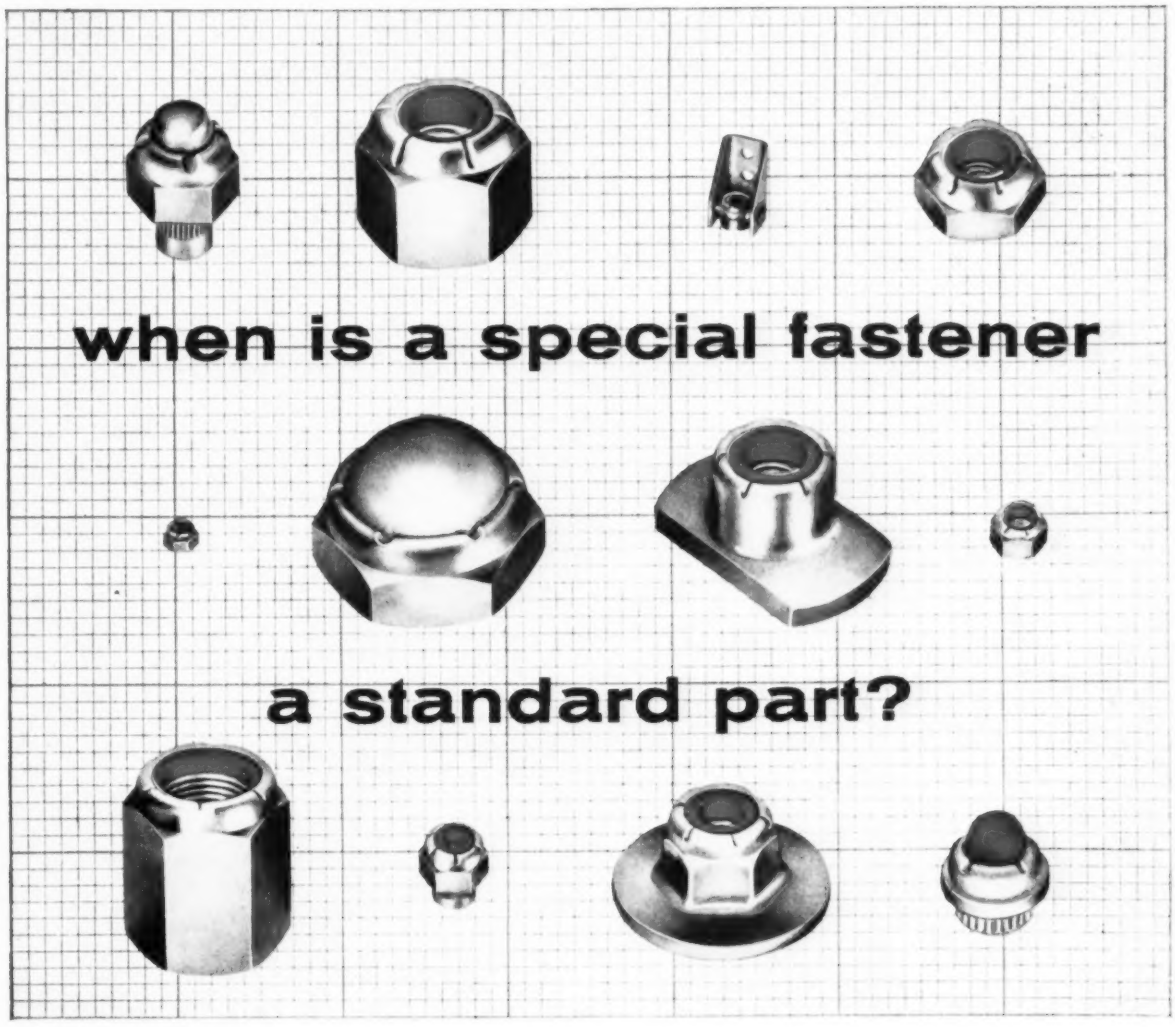
Reducing Agent—General Electric's Gear Motor and Transmission Components Dept. has developed a new shaft-mounted speed reducer for applications where complex multiple reduction belts or chain drives are required. The reducer offers flexibility of mounting arrangement, increased safety, and lower maintenance expense.

All Aboard, Aluminum—Aluminum baggage car doors, designed to replace steel units twice their weight, are being tested by the Pennsylvania Railroad. Eight doors, fabricated by the Jobbing Div. at Aluminum Co. of America's New Kensington, Pa., works, have been installed on two PRR cars for lengthy trial runs. About 166 lbs. per door, it eases the opening and closing operation to facilitate baggage movement.

Ready for Business — Vapo-Therm Systems, Inc., Detroit, has been organized to design and fabricate specialized processing equipment. The March Corp., Detroit, has been appointed sales engineering representatives and the firm of W. L. Bager and Associates, Inc., Ann Arbor, has been retained as consulting engineers.

Going Abroad — Philco Corp. and The Plessy Co., Ltd., have organized a new company to manufacture transistors in England. It will be known as Semiconductors Ltd.

"Do you mean we have a 215,000 kw turbine generator here, and there's no place to plug in my coffee maker?"



The answer is easy: when it's an ELASTIC STOP® nut. ESNA makes and stocks more types, shapes and sizes (in a larger variety of materials and finishes) than any other lock nut manufacturer. In fact, all of the nuts shown here are standard production parts.

Every one of these fasteners is self-locking anywhere on the bolt, will remain tight under severe vibration . . . yet they can be dis-assembled and re-used many times. What's more, the performance of the red locking insert has proved itself in critical applications on American heavy industrial equipment for more than twenty-five years.

All ESNA nuts are carefully controlled in manufacture as to finished dimensions, class of thread fit and finish. This control pays off—in uniform quality every time you order.

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William M. Hall, elected vice president, in charge of sales, Wheeling Steel Corp., Wheeling, W. Va.

Richard C. Cunningham, elected vice president, sales, Baltimore company, Eastern Stainless Steel Corp.

Lewis J. Cox, elected first vice president and chief executive officer, Iron Fireman Manufacturing Co., Cleveland.

Andrew A. Kucher, elected vice president, Ford Motor Co. and appointed vice president, engineering and research.

Frank W. Knecht, Jr., elected vice president and general manager, Brainard Div., Sharon Steel Corp., Warren, O.

Hermann K. Intemann, elected president, Electro Metallurgical Co., Div. of Union Carbide and Carbon Corp.

Max E. Bills, named division superintendent, sheet mill, Gary Sheet and Tin Mill, U. S. Steel Corp.

M. E. Swaim, elected vice president, sales, National Supply Co., Pittsburgh.

Roy E. Nelson, elected vice president, American Gilsonite Co., Salt Lake City, Utah.

Harvey J. Haughton, elected vice president and controller, Jones & Laughlin Steel Corp.; **John W. Lindsey,** elected vice president, purchases.

William M. Valiant, elected asst. treasurer, Borg-Warner Corp., Chicago.

Donald J. Stalker, named asst. comptroller, U. S. Steel Homes Div., U. S. Steel Corp.

James S. Anderson, elected vice president, in charge of sales, Tubular Products Div., The Babcock & Wilcox Co., New York.

Grover R. Ginder, named asst. to division superintendent, West Mills, Gary Steel Works, U. S. Steel Corp.

William J. Waller, named manager, Work Order Dept., Joseph T. Ryerson & Son, Inc.; **Richard T. Rollison,** named manager, Reinforcing Steel Products Dept.

Don S. Permar, named asst. general sales manager, Le Roi Div., Westinghouse Air Brake Co., Milwaukee.

D. L. Irvine, appointed general manager, sales, Wheeling Steel Corp., Wheeling, W. Va.

George J. Bruyn, appointed New England district sales manager, Hooker Electrochemical Co., Niagara Falls, N. Y.

Earl L. Beenfeldt, appointed asst. manager, trade sales, National Lead Co., New York.

Vincent R. Barrord, appointed manager, development sales for welded tubing, The Babcock & Wilcox Co., Alliance, O.

William E. Sprackling, elected president and chief executive officer, Anaconda Wire & Cable Co.; **Richard B. Steinmetz,** elected executive vice president; **David E. Allen,** elected vice president, sales;

Vito F. di Lustro, elected vice president, manufacturing.

Kenneth H. Pierce, appointed sales manager, Precision Castparts Corp., Portland, Ore.

R. J. Myers and **Donald Loeser,** appointed manufacturer's representatives, Far Western area, The Youngstown Foundry & Machine Co., Youngstown, O.

William F. Hunt, named manager, Pittsburgh district office, Edison Storage Battery Div., Thomas A. Edison Industries, McGraw-Edison Co.

Charles A. Taylor, named manager, Washington district office and **James A. Mustard, Jr.,** named regional sales manager, Chicago and St. Louis districts, Edison Storage Battery Div., Thomas A. Edison Industries, McGraw-Edison Co.

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H. Daniel Robb, appointed national product manager, alloy steels, Joseph T. Ryerson & Son, Inc.

R. P. Bowdich, named asst. general product manager, Bakelite Co., Div. of Union Carbide and Carbon Corp., Bound Brook, N. J.

Douglas Dickinson, appointed regional sales manager, Chicago district office, Heli-Coil Corp., Danbury, Conn.

Dr. Charles J. Kentler, Jr., named New York district sales manager and **Charles B. Goff, Jr.,** named Pittsburgh district sales manager, Meter and Valve Div., Rockwell Manufacturing Co.

Henry S. Harrison, appointed plant superintendent, Machine and Tools Div., Michigan Tool Co., Detroit, Mich.

Lloyd H. Shenefelt, Jr., named contracting manager, Cincinnati district, American Bridge Div., U. S. Steel Corp.

George W. Knowlson, named division credit manager, Miami, Fla., Kaiser Aluminum & Chemical Sales, Inc.

James W. Charbonnier, appointed director, industrial and plant engineering, The Black & Decker Manufacturing Co., Towson, Md.

Joseph W. Garrett, named general manager, distribution and service; **William B. Hughes,** named general manager, Overseas Sales Div., Commercial Dept., U. S.

Steel Export Co., subsidiary of U. S. Steel Corp.; **Eugene J. Brinkman,** named manager, Direct Sales Div.

Wallace Collett, appointed product sales manager, Material Handling Dept., Tractor Group, Allis-Chalmers Manufacturing Co., Milwaukee.

Ellsworth A. Stockbower, appointed manager, new product sales, Metalworking Chemicals Div., American Chemical Paint Co., Ambler, Pa.

Dr. Eugene Miller, appointed director, research and development, solid propellants, Explosives Div., Olin Mathieson Chemical Corp., New York.

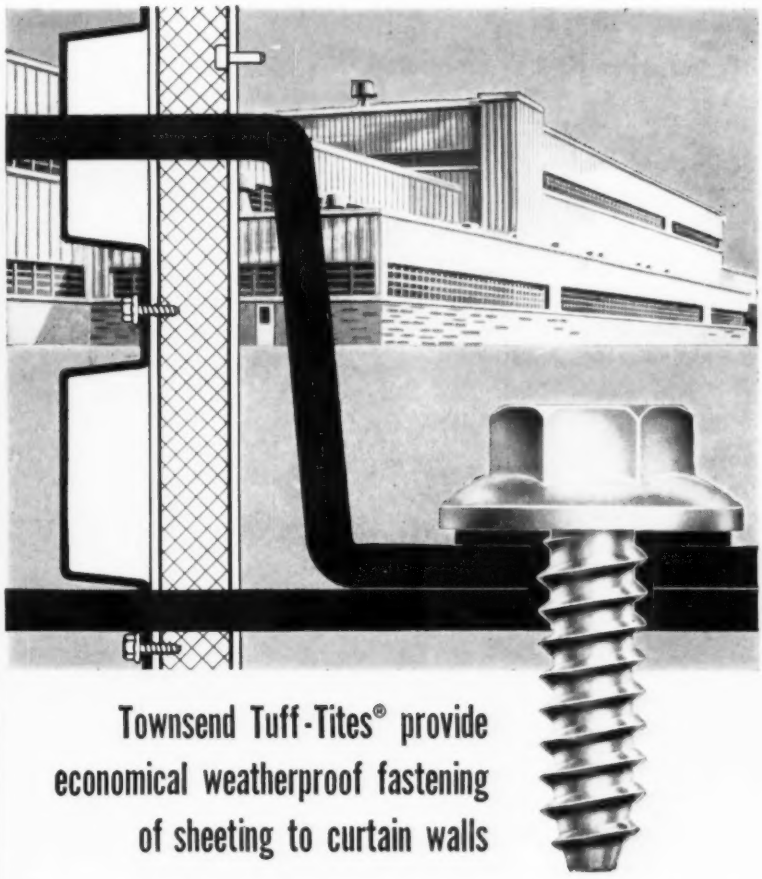
Edward H. Rote, appointed chief engineer, Sahlin Engineering Co., Inc.

Ladd F. Burkhardt, named representative, Indiana and Kentucky, S. W. Card Div., Union Twist Drill Co., Mansfield, Mass.

John T. Petersen, appointed manager, metals industry sales, Allis-Chalmers Industries Group, Cleveland.

John H. Chiles, Jr. and **B. M. Brown,** elected vice presidents, Westinghouse Electric Corp., Pittsburgh.

James L. Hamilton, Jr., appointed district manager, sales, Kansas City office, Granite City



Townsend Tuff-Tites® provide economical weatherproof fastening of sheeting to curtain walls

Townsend Tuff-Tite fasteners provide weatherproof fastening of exterior sheeting to insulated panels used in curtain wall and roof construction. Leakage is eliminated by the Tuff-Tite's integral undercut hex head and washer construction and by the pre-assembled conical shaped neoprene washers which fill the holes.

An outstanding application of Tuff-Tites in curtain wall construction is the "A" panel made by Elwin G. Smith & Co., Emsworth, Pa. These panels are made with a number of different surfaces and have been installed by Elwin G. Smith on buildings in varying climates from New England to Texas.

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For more information on these economical, weatherproof fasteners, write to Townsend Company, P.O. Box 237-A, New Brighton, Pa., asking for Bulletin TL-107a.

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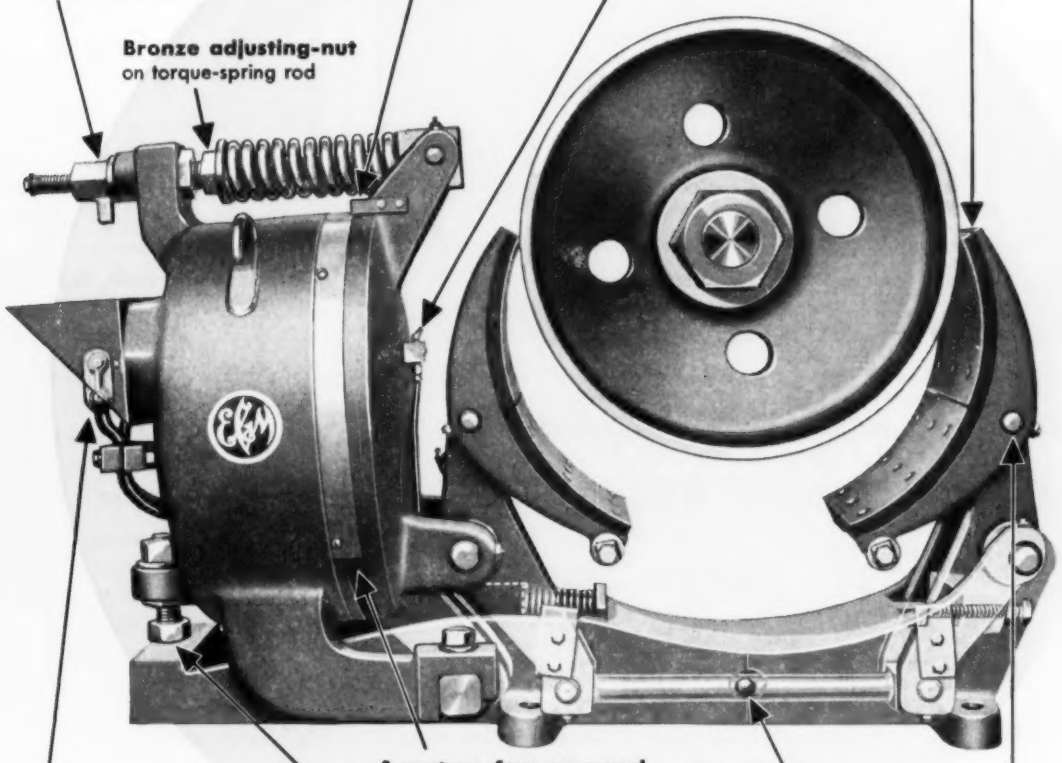
Molded brake blocks permit 1/8" wear on smallest size to 7/16" on largest size
100%-lubricated forces dirt out, all bearings alemite-lubricated
Manual release is standard on all sizes
Visual armature air-gap indicator
Bronze adjusting-nut on torque-spring rod
Armature-face recessed at bottom allows dust to fall free—prevents clogging
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Solderless connectors under protective shield. Conduit connection box is optional
Single adjustment for brake lining wear. Adjusting-nut screws into stainless steel, threaded bushing in magnet-case
Fixed bearing-pins locked with stainless steel set-screws reduce number of lubrication points

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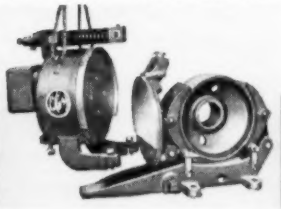
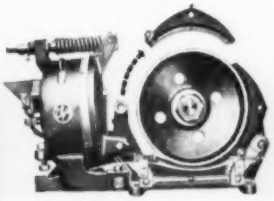
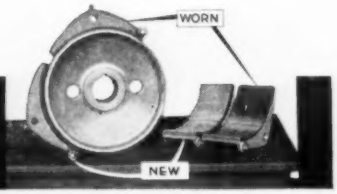


SHOES AND LINERS EASILY REMOVED



ACCURATELY FORMED BRAKE BLOCKS



8624

This 5000-ton Farquhar Split-Die Forging Press is used to form components of oil-well equipment at the Cameron Iron Works, Inc., Houston, Texas.

This Farquhar Split-Die Forging Press forms both bore and periphery in one fast, clean operation

The job was to press-forge parts weighing up to 2000 pounds having irregular contours on both the bore and the periphery. These parts in service had to withstand working pressures up to 15,000 pounds per square inch and temperatures up to 1600 degrees F. The successful solution was to put the job on a Farquhar Split-Die Forging Press.

This Farquhar Split-Die Forging Press applies horizontal forces from opposite directions as well as the normal down-action. The result is the production of high-strength parts with unusually clean surfaces whatever the contour. This cuts finish machining time to a minimum and provides forgings with uniform physical properties and controlled grain structure. Reported production savings run as high as 25% with rejects kept to a minimum.

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OLIVER Farquhar PRESSES

Also Manufacturers of Farquhar Conveyors

Steel Co.; **Warren H. Bell,** named district manager, Dallas office; **John G. Quade,** named resident manager, Houston, Tex.

James R. Kerr, elected president, Lycoming Div., Avco Manufacturing Corp.

Joseph N. Kemple, named sales manager, Page Steel and Wire Div., American Chain & Cable Co., Inc., Monessen, Pa.

Roland S. Yale, named products sponsor, sheet and strip sales, Milwaukee plant, Joseph T. Ryerson & Son, Inc., Chicago.

Robert W. Ramage, appointed asst. manager, Eastern sales, Buffalo headquarters, Bliss & Laughlin, Inc., Harvey, Ill.; **Lynn M. Kilian,** appointed Hartford district sales manager; **Carl F. Steinbach,** appointed Buffalo - Rochester sales representative.

William A. Smith, appointed Eastern regional manager, Ceco Steel Products Corp., Chicago.

Robert F. Page, appointed supervisor of training at the Pittsburgh Works, Jones & Laughlin Steel Corp., Pittsburgh.

Peter J. Prevas, appointed assistant plant superintendent, Arcrods Corp., Sparrows Point, Md.

Harvey E. Bland, appointed manager, Technical Service Dept., Diversey Corp., Chicago.

Lester M. Curtiss, named executive asst., operations, Lukens Steel

Co., Coatesville, Pa.; **Lloyd P. McAllister,** named general manager, production, and **Edward J. Charlton,** named general manager, engineering and services.

George W. Searles, named manager, wire rope and electrical wire sales, Columbia-Geneva Steel Div., U. S. Steel Corp.

Howard K. Norris, appointed factory manager, power transmission belt plant, United States Rubber Co., Tacony area, of Philadelphia.

Grayson K. Bailey, appointed sales engineer, American Fire Clay & Products Co., Canfield, Ohio.

Henry J. Harden, named abrasive engineer, Peninsular Grinding Wheel Div., Detroit.

Glenn A. Stertzbach, appointed master mechanic, George L. Day Co., Buffalo, N. Y.

W. Scott Lightner, named research engineer, metallurgy, Vanadium-Alloy Steel Co., Latrobe, Pa.

Shelley S. Salyards, appointed manager, Schaefer plant, Burroughs Corp., Detroit.

Odd H. McCleary, elected president, Mathews Conveyer Co., Ellwood City, Pa.

Richard V. Grogan, appointed West Coast representative, Foundry Products Div., Archer-Daniels-Midland Co., Cleveland.

OBITUARIES

Sam Case, Battelle Memorial Institute, April 9.

Arthur L. Fleck, vice president, sales, American Screw Co.

Wendell E. Whipp, 73, chairman of the board, Monarch Machine Tool Co., Sidney, O.

Frank R. Freyler, 56, manager, Mid - Atlantic regional, Allis-Chalmers Industries Group.

Harry Way, 50, secretary and treasurer, Offenhauser Co.,

George A. Fyrbert, 62, production manager, Abrasive Div., Norton Co., Worcester, Mass.

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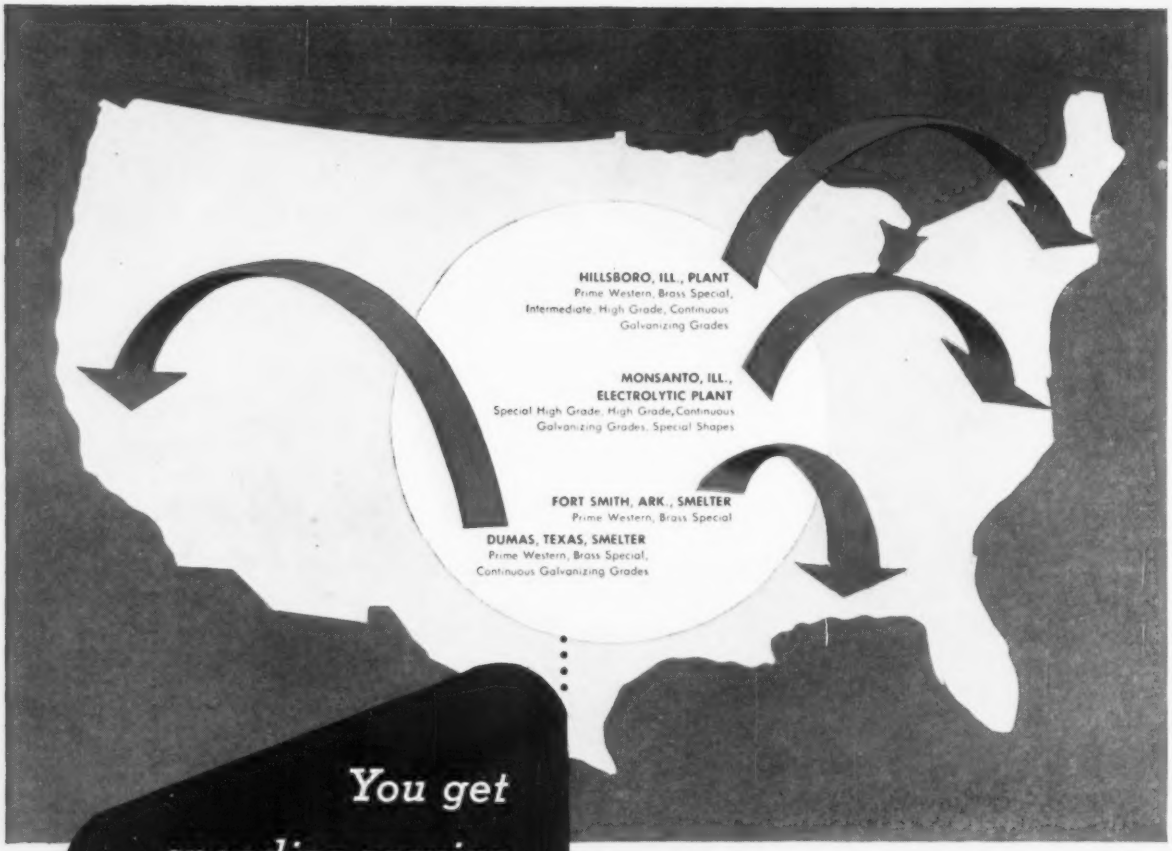
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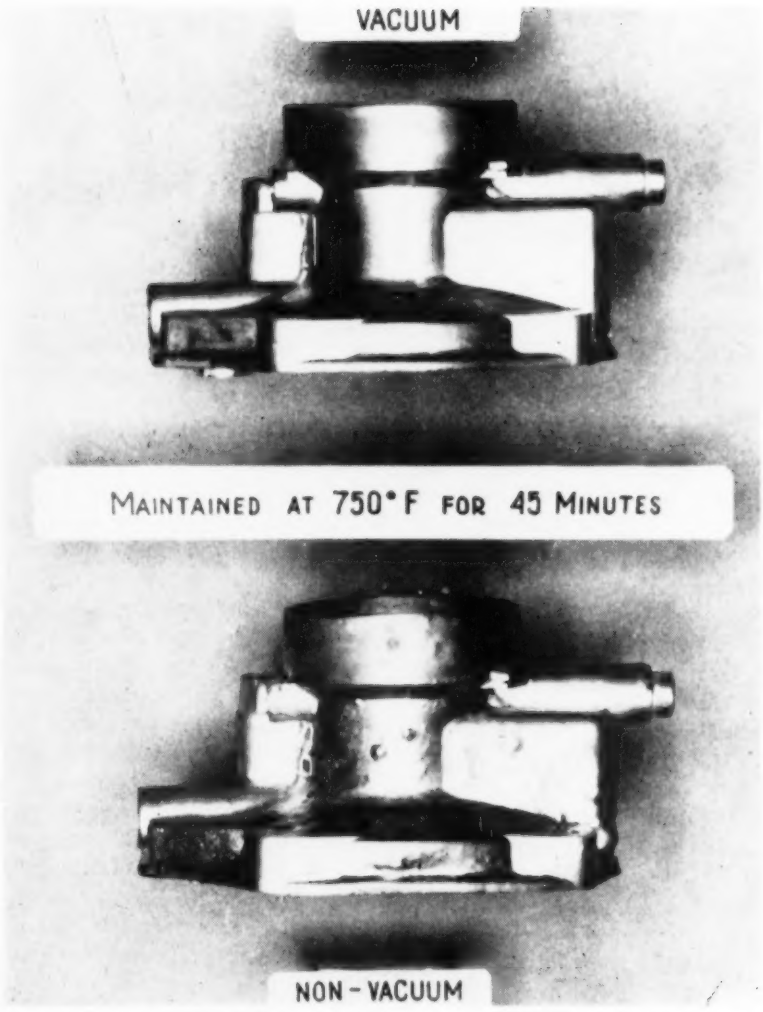
Vacuum Die Castings: Quality In, Porosity Out

By E. J. Egan, Jr., Machinery Editor



NO MORE BLISTERS: When heated, air trapped in conventional casting expands to blister the surface (bottom). Absence of this porosity effect shows clearly in smooth vacuum casting (top) after heating.

Porosity causes most of the troubles for producers and users of conventional die castings.

Now it can be eliminated—with a new vacuum casting technique that's simplicity itself.

The process already shows signs of booming the use of die castings to new heights.

▪ Vacuum die casting is one of those rare processes that strews liberal benefits in all directions. Although the technique is only a couple of years old, it has already produced some impressive results. It has, for example:

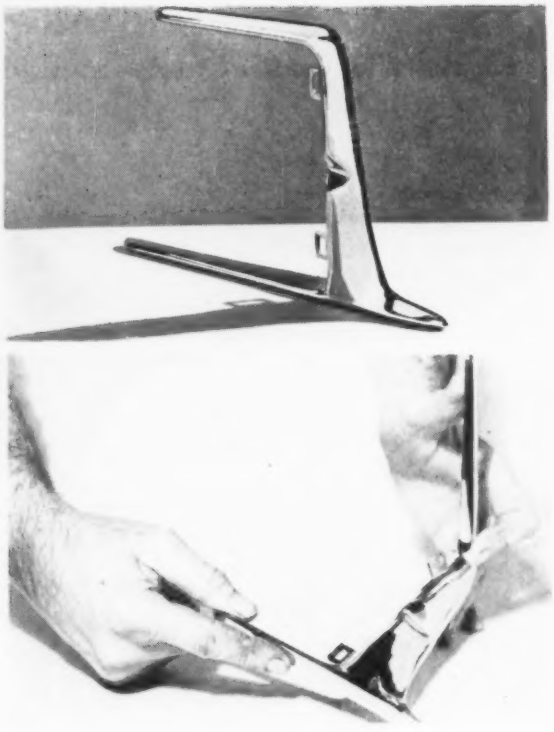
1. Stimulated sales of both new vacuum-diecasting machines and vacuum conversion units for existing machines.

2. Given die casters a fast, economical production technique that virtually guarantees a better product and fewer rejects.

3. Shown product designers that top-quality zinc and aluminum die castings can not only take on a lot of new jobs, but also handle the old ones better than ever.

Vacuum-diecast zinc parts, for example, are practically free from porosity. You might expect this to make the castings somewhat more ductile than typical pressure-cast components. But it comes as a

ABOVE: Hood sections of this Vacucast machine at Cleveland Hardware Forging Co. are open at end of cycle. Vacuum accumulator tank is behind machine.



RIGHT: Before it breaks, this vacuum-diecast trim piece can be bent until the long extensions almost point 180° apart.

startling surprise to find that you can actually bend a thin vacuum cast section almost double before it breaks.

Anodizing Looks Big—Equally important from a product design standpoint—perhaps even more so—is what vacuum die casting promises for aluminum. Now, and solely because of this process, low-silicon aluminum alloys can not only be cast successfully, they can also be anodized in the full range of clear and colored finishes without fear of blemishes showing up later.

Happily, the means of eliminating the porosity bugaboo from pressure die castings is readily available. It is straightforward vacuum equipment that can be built into or adapted to practically any pressure-casting machine.

Prototype equipment for what is now known as the Vacucast process was conceived and developed by David Morgenstern, vice president, Nelmor Mfg. Corp., Euclid, O.

Immediate Success—It was first applied in the firm's zinc diecasting department with the hope it would aid the production of quality auto accessories. Result: it promptly cut both casting and finishing rejects to negligible levels. Customers, too, were quick to note and approve the better casting structure and plated finish.

Success of the process led Nelmor to build and sell vacuum conversion units for existing die casting machines, which it still does. In addition, U. S. rights to manufacture new vacuum diecasting machines were given to the Reed-Prentice Corp., Worcester, Mass. Similar European rights are held by the Sparklets Div., British Oxygen Co., London.

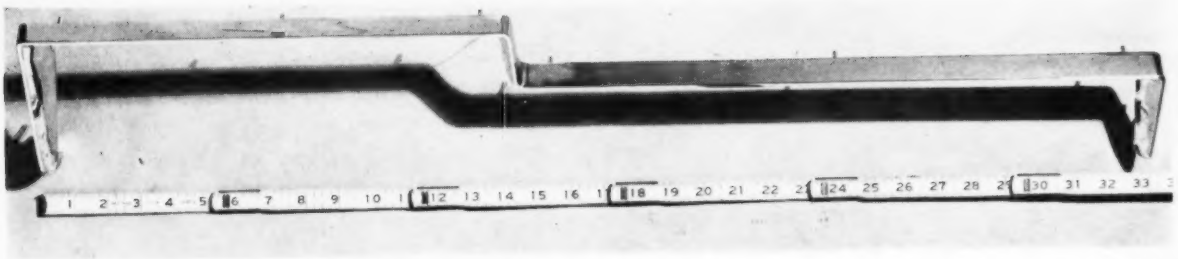
Vacuum equipment for both hot and cold-chamber diecasting machines consists essentially of three parts: (1) a hood enclosing the die platen area, (2) a vacuum pump and (3) a large accumulator storage tank.

Hood Telescopes — The platen hood is in two sections. One surrounds the movable platen, the other covers the fixed platen. Mating surfaces of the hood sections are cushioned with a telescoping compression seal that compensates for varying die heights.

The vacuum-casting cycle on a typical hot-chamber, zinc die-casting machine begins when the operator pushes the "start" button. This starts the closing action of the movable die half and its hood section. Mating surfaces of the two hood sections meet and form a seal while the die faces are still about ½ in. apart.

At this point, the movable die pauses momentarily while a massive vacuum (14-20 in. of mercury) instantly evacuates all the air inside the hood. A valve prevents molten zinc alloy from being drawn up into the die at the same time.

Dies Lock Easily—When all the air is out of the hood, the dies close smoothly, with no strain and a



A TOUGH ONE: Production on this bezel with straight casting in a single cavity die is 80 shots per hour with 9 pct rejects. Trouble comes in trying to shoot zinc alloy to the ends and still get a good finish. Vacuum casting yields 125 per hour, under 2 pct rejects. Four hundred ton machine is used.

minimum of locking pressure. The plunger in the metal pot then forces molten alloy into the die cavities.

When the "shot" is completed, and vacuum is no longer required, a valve closes between the hood and the accumulator tank. This allows the tank to start its vacuum recovery cycle while the hood vents itself to the atmosphere. After a short interval in which the casting solidifies, the plunger retracts, the dies open and the casting is ejected to complete the cycle.

Experience shows that vacuum casting is faster than conventional pressure die casting, often by 30 pct and more. There are two major reasons: (1) evacuation of air occurs while the dies are closing; (2) "dwell" time for the casting to solidify is shortened because the part contains no entrapped air.

Undeniable Benefits—Firms using the Vacucast process report a string of impressive benefits. H. E. White, president of The Cleveland Hardware & Forging Co., says, "Where wall sections in zinc die castings previously ran from 0.050 in. to 0.070 in., thickness can be cut 25 pct without losing physical strength. The weight and cost savings make these castings competitive with stampings."

In Detroit, president Lee Radke of Adjel Products Co. switched 27 problem jobs from pressure-casting equipment to a Reed-Prentice No. 2 zinc Vacucast machine. Without any die alterations whatsoever, benefits such as these were noted: Production increased by as much as 45 pct; rejects after casting shrank from 15 pct to ½ pct; rejects after plating dwindled from 8 pct to 1½ pct.

On a 15-in. ring casting, where die alterations were made to take full advantage of vacuum casting benefits, results were equally impressive. By eliminating webs between bosses and reducing the size of gates and runners, casting weight was cut from 9½ to 5¼ lb. And production jumped from 97 shots per hour with 15 pct rejects to 131 shots per hour with rejects under 2 pct.

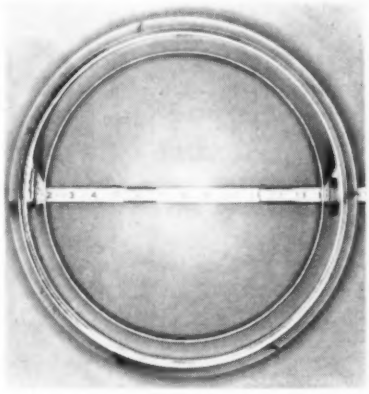
Just Skip Inspection — Adjel policy is not to inspect Vacucast parts at the machine. With rejects running less than 2 pct, it isn't worth the time.

The pickup in casting production makes the polishing job easier, too. Hand buffing is 27 pct faster with vacuum castings than it is with conventional pressure castings.

As applied to a cold chamber machine for diecasting aluminum, the Vacucast process (1) eliminates hand ladling or other devices for filling the charging cylinder; (2) effectively degasses the molten metal before it goes into the die cavity; (3) pulls molten metal from the interior of the holding furnace so that it is not exposed to the atmosphere.

Metal Stays Fluid—The process also prevents temperature loss in the metal, so that high-silicon alloys are not required to maintain fluidity over a wide temperature range.

Thus far, Nelmor in Cleveland is the only firm to do vacuum die casting of aluminum on a production basis. Results, however, have established definitely that these castings, free from silicon and oxide inclusions, are as anodizable as sheet or extruded aluminum products. And absence of porosity gives them a dense, almost forging-like structure. These factors—added to diecasting's traditional speed of production and perfection of detail—should boom the use of vacuum diecast aluminum parts.



WEIGHT SAVINGS: By eliminating webs between bosses and cutting down on the size of gates and runners, vacuum process took 4 lb off the weight of this ring. Production went up 35 pct, too.

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Trucks Team With Cranes To Provide Flexible Handling

By H. R. Falquet—Assistant Plant Engineer, Midland Steel Products Co., Cleveland

Constantly changing production schedules mean a headache in handling material.

There is no headache where the teamwork of industrial trucks and overhead cranes combine to handle any material transfer.

Experience shows that the trucks can take the beating of hard usage.

▪ Your handling system can often be served best by the efficient layout of work stations. But what about cases where changing processing requirements prevent a fixed layout? You'll find that the handling system has to be flexible.

Yearly Changes—Here's how one company has done it. Midland Steel Products Co., producer of frames for the automotive industry, finds that a fixed production schedule is impossible because of yearly model changes.

With the continuous change in material flow patterns, the basic departments cannot be relocated. For example, a frame which may be riveted one year may be welded the next.

The problem is accentuated by the severe operating conditions encountered in handling products made entirely of steel. Nevertheless nearly 250 million lbs. of material are processed each year on a routine basis at the Midland plant.

Starts Here—Incoming sheet and coil steel is initially transferred by overhead traveling bridge crane to pickling and shot blasting operations. After this processing, the material is placed on transfer buggies that operate on tracks which run the entire length of all the five buildings of the plant.

The primary means of providing the flexibility is by a fleet of 35 powered industrial trucks. They make it possible to change material flow patterns as required without affecting handling operations and costs.

Standard Containers—To work with the industrial trucks, two basic kinds of containers are used. One is an all-metal skid bin measuring 48 x 42 x 41 in. The other is a skid mounted frame for carrying longer components measuring 40 x 66 x 72 in.

The handling flexibility of the trucks can be illustrated by the fact that truck loads range from six to 12,000 lbs. where moves may be as long as 1000 ft.

Even though many of the production areas are concentrated and do not allow truck travel, all lines have been laid out with sufficient gaps to permit cross travel throughout the plant. Collection areas are provided where cranes can spot loads to be picked up and deposited by the powered rolling equipment.

Move Overhead — Since some frame components range up to 21 ft. in length, they cannot be handled over the floor due to minimum aisle widths and concentrated production areas. For these loads more than 30 overhead bridge cranes speed handling and eliminate congestion.

For scrap handling, portable belt conveyors are used at many presses to continuously transfer scrap into waiting skid bins. From these locations, trucks remove the containers to centralized scrap collection areas where the bins are dumped by crane into rail cars.

Work Horses—The trucks have additional chores such as die handling and die spotting in presses not served by overhead equipment. Dies can actually be placed and removed from presses when required.

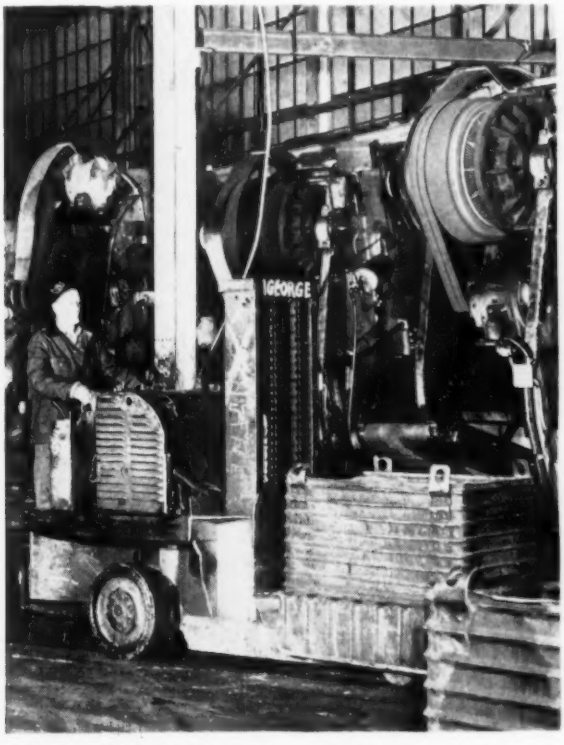
Other handling jobs include storage of in-process loads and completed frames in yard areas.

Handling equipment is on the job two and sometimes three shifts per day in a five or six day week. Because of the demands of this service, a maintenance program is of vital importance in keeping costs to a minimum.

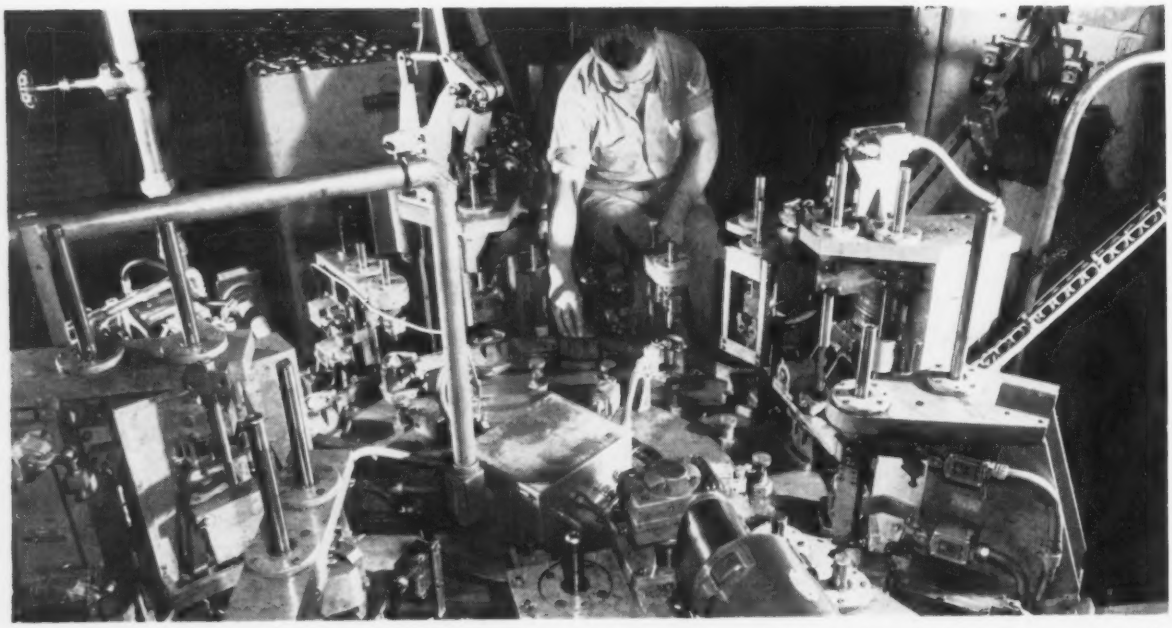
WORK HORSE: Flexible handling is attained using these husky industrial trucks. Standard frame measuring 40 x 66 x 72 in. facilitates loading.

CRANE HELPS TOO: The standard frames are designed for crane handling. Overhead handling is prescribed for areas not accessible to industrial trucks.

ALL-METAL BINS: Small components are handled in standard skid bins 48 x 42 x 41 in. Here yard storage is utilized for in-process loads.



SCRAP HANDLING: Conveyors are used at many presses to continuously transfer scrap into skid bins. The bins are then shifted to scrap collection areas.



AUTOMATIC ASSEMBLY: The operator loads one basic part on the circular table which indexes through the automatic work stations. The machine automatically rejects defective parts.

A New Plant Stresses Automatic

From receiving to shipping, the new Ford plant at Sterling makes automation pay off.

It all means increased quality, maximum efficiency, and better working conditions. Safer too.

▪ The building of a new plant has given engineers an opportunity to put to use advances in production techniques. They have incorporated the latest in automatic processing equipment.

The new plant at Sterling, Mich., completed by Ford Motor Co. in Sept. 1956, turns out chassis components. Automatic transfer machines, presses, and material handling equipment have been included in 1200 new machines purchased for the plant.

Automatic Machining—Transfer machines process front wheel spindles, axle housings, differentials, and other parts. A typical transfer machine consists of a series of self-contained machining units linked together by conveyors.

You feed a work-piece into the machine. It goes through all the operations automatically before being discharged.

Take the transfer machines processing front wheel spindles. Each machine contains 18 stations and weighs 127 tons. The 84 tools in each remove about 200 lbs of metal per hour.

An idea of the complexity is given by looking at the electrical circuits: 120 limit switches, 288 relays, 197 solenoids, and 20 miles of wiring.

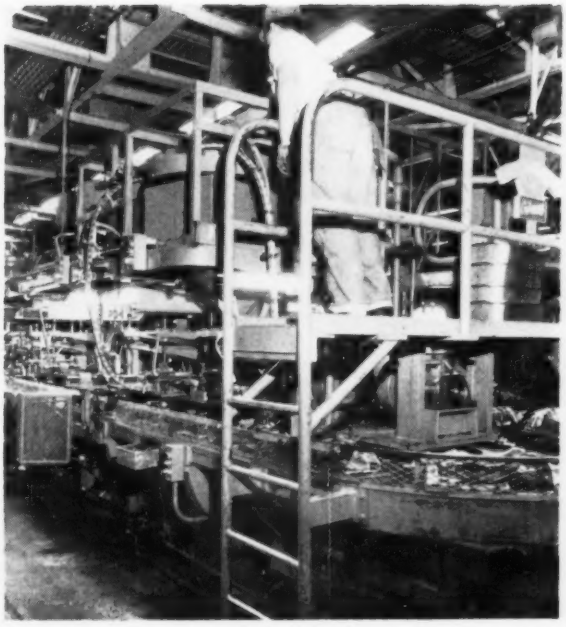
Coiled Steel Used—Located near the steel receiving area, several transfer presses shape coiled steel into parts for rear axle housings and front suspension arms. The presses utilize progressive dies which perform operations on parts moving through 10 or more stations.

Mechanical fingers index parts through successive stations. Each cycle of the press moves one blank into the series of dies and one completed part out at the opposite end.

Assembly—Automatic assembly may still lag behind automation in machining, but it was given increased attention here. Four machines automatically assemble parts to form the ball-joint front suspension units at 640 pieces per hour.

In one of these machines assembling the upper suspension arm, the parts are locked onto a fixture to be moved along a circular track through 38 stations.

GEAR CUTTING LINE: Precision cutting of gears is performed in row after row of automatic machines.



HOPPER FEED: Thousands of parts are fed as 640 assemblies per hour move through 38 stations.

Layout

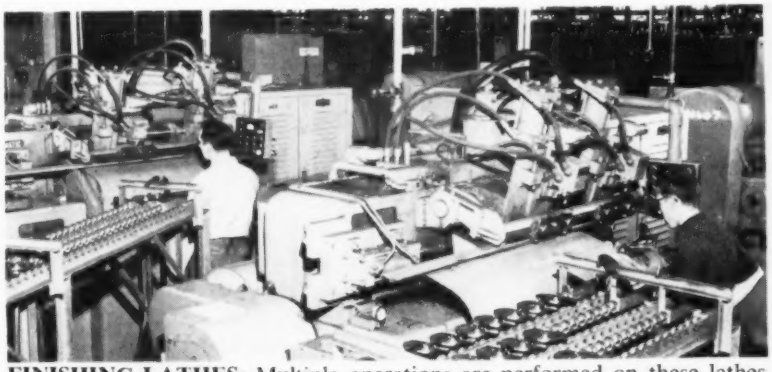
Electrical controls and cam mechanisms direct the assembly of 13 parts and inspect each operation. The machine will do everything from riveting to filling the ball joint with grease.

Inspection — Any defective part is designated as a reject by a memory unit. The reject moves through the remaining stations without further work being performed.

Smaller rotary index machines automatically assemble the upper and lower ball-socket assembly. They cycle at 1280 times per hour.

The gear cutting department has taken on automation with 695 machines in all. Pinion and ring gears are automatically rough and finish cut.

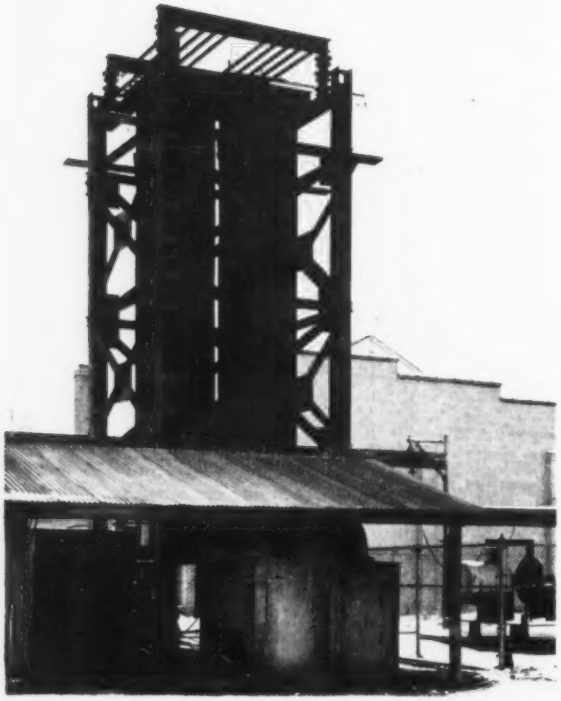
An up-to-date maintenance program serves the automatic layout, keeping it in tip-top shape.



FINISHING LATHES: Multiple operations are performed on these lathes which are controlled by hydraulic tracer principle.

TRANSFER DRILLING: The 13 stations drill and bore automatically. Cap bolts are applied with torque on assemblies in final operation.

SMOKE CONTROL OFF: Electrostatic precipitator for wire burning operations gushes heavy cloud of smoke when unit is turned off.



SMOKE CONTROL ON: And here's how the same electrostatic precipitator looks with control on. Smoke disappears in 5 seconds or less.

Scrapyards Cut Down Smoke With Incinerator Controls

By **P. C. Houston,** Manager, Smokatron Div., Summer & Co., Columbus, O.

Legislation clamping down on air pollution seems bound to increase. This poses problems for scrapyards which burn cars, wire.

Burning is efficient. But as public anti-pollution pressure builds up, more incinerators are being fitted with smoke controls.

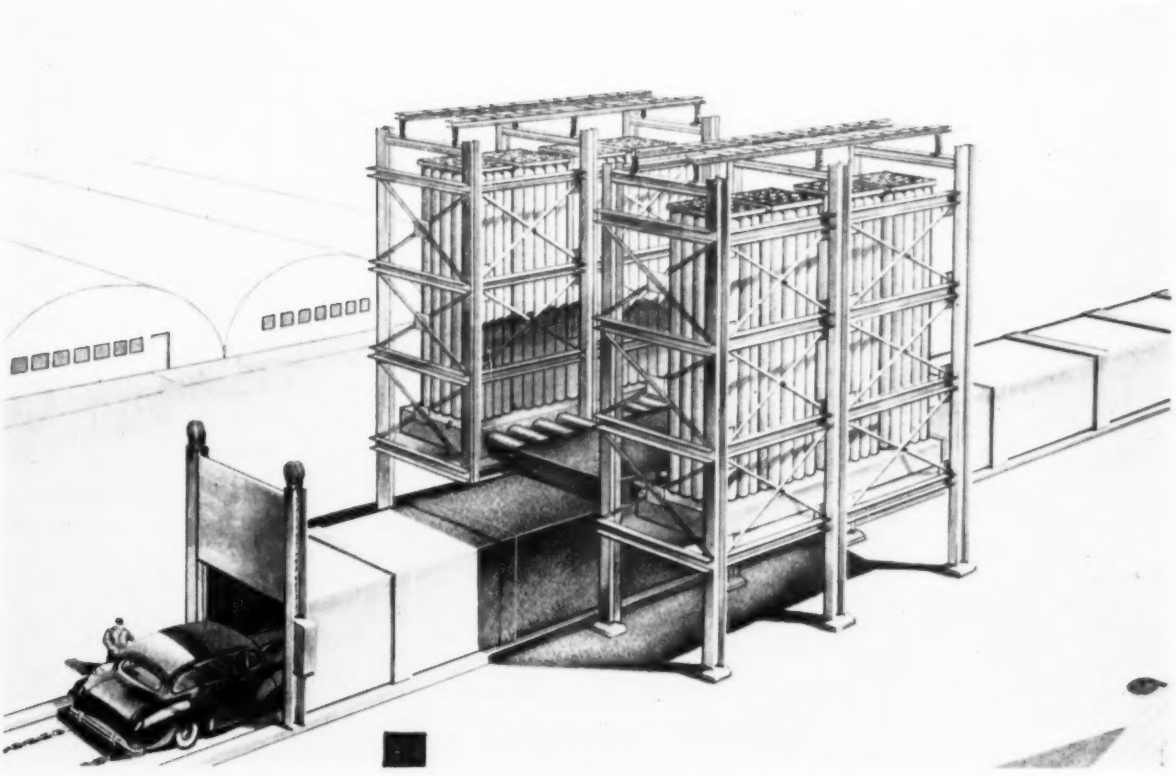
Here's data on what they do, what they cost, what they are.

▪ Preparing metallic salvage materials for re-use poses some difficult problems for scrap dealers. Where copper wire and auto bodies are concerned, burning's the best answer. No other method compares with it for simplicity, economy and excellence. But in these times, air pollution control is the order of the day.

The result is that scrap dealers can no longer just touch off a big pile of wire or car bodies in urban areas, producing a smoke column visible in the next county. Increasingly, laws are being made to control air pollution. And enforcement's becoming stiffer.

This means incinerators, fitted with proper smoke controls.

No Cheap Way Out—In considering the scrap dealer's problem from an engineering viewpoint, it's immediately apparent that any idea about a cheap incinerator to burn cars is just wishful thinking. It's



FOR AUTOMATED BURNING: This high-production, conveyor-equipped, continuous-kiln-type burner can handle 80 to 150 cars daily. Units like this remove all visible smoke and virtually all odor.

obvious that the smallest unit which can be built is a firebox to take one car at a time. For flexibility, such a box has to be at least 8 x 8 x 20 ft. Refractory linings, if used, pose additional problems. There's the danger of loss due to oxidation.

But even more important, think what rough-and-ready scrapyard labor does to refractory linings while putting a car in and dragging it out. And refractory linings are expensive to repair.

The Alternative — But if you eliminate refractory linings to forestall such difficulties, then you have to go to a proportionately-heavier plate which will stand up under such service. Our experience shows that a 1-in. thick, firebox-quality steel plate will give excellent service. But the minimum firebox described above would contain 789 sq ft. Or, with bracing, about 16 net tons of steel plate.

This adds up in cost. Fabricated, this might run you between $300-$400 per ton, depending on local labor costs.

Thus it's apparent that a simple box, with only the simplest of door arrangements, will cost somewhere between $5000 and $6500 for materials and direct labor alone. And since the whole idea is to eliminate smoke, it's obvious that equipment to accomplish this must now be added to the cost of the firebox.

Afterburner Approach — Probably the cheapest type control equipment that would have any degree of effectiveness in the application would be the afterburner. This is a secondary combustion chamber which is maintained at a constant high temperature (1800° to 2200°F for best results). It's fired with auxiliary fuel, generally oil or gas, through which the smoke from the original burning passes. This burns a great deal of the carbonaceous material, which is the usual substance that gives smoke its black color.

When afterburners are well-designed and properly operated, the vapor released to the atmosphere may be reduced to a light haze. Such an installation would comply with requirements in communities which regulate on the basis of smoke color or density.

Even this type installation costs an estimated $6000 to $8000. Add this to our previous figure for a simple firebox. We come out, on the bare direct cost of the smallest practical unit, and with the cheapest method of smoke control, at between $11,000 and $14,500.

Not Complete Answer — Also, the afterburner has some substantial drawbacks. The secondary combustion chamber has to be lighted some time in advance of any mate-

Bigger units will be needed but they won't be cheap

rial burning, since it has to be brought up to operating temperature before any smoke can be introduced. Also, there's usually a fairly substantial maintenance cost on anything operating in the 2000°F range.

Finally, the trend everywhere is away from regulation based on smoke abatement geared to color and more toward air pollution factors. As this trend grows, afterburners may be in trouble, since they normally do nothing about one of the bugbears of scrapyard burning. That's sulphur dioxide, which is non-combustible.

Another control method applicable to scrapyard installations is electrostatic precipitation.

Recovers Materials Too—Electrostatic precipitators have been adopted by a number of industries for a wide range of collection problems. They've served twin purposes, both from the standpoint of eliminating air pollution and in recovering materials that would otherwise be lost. The steel industry in recent years has spent large sums on electrostatic precipitation to clean up the smoke discharge from their furnace operations.

In power plant operations, precipitators to eliminate smoke and fly ash from boiler operations are frequently 98-99 pct efficient.

How do precipitators work?

Simple Principle — Just as the rubber barrel of a fountain pen becomes charged with static electricity when you rub it on wool so that it attracts paper particles, so are precipitators charged. A high voltage field is maintained in the unit. The smoke or vapor passes through this field and the particles carried by the smoke pick up a negative charge.

This causes them to be attracted to the positive poles or collecting electrodes. The highly efficient method permits ready charging and removal of particles down to 0.00050-in.

For highest efficiency, particularly when working with metallic vapors, a series of fog spray nozzles mounted in intake manifolds will completely or largely saturate the incoming smoke before it reaches the precipitator field. This is not only highly efficient in collection but has a beneficial side effect. Sprays act as a horizontal scrubber to wash out a considerable volume of such water-soluble gases as sulphur dioxide.

Workhorse Unit—One type of electrostatic precipitator for scrap yards consists of 50 six-inch diam. 5/16-in. wall seamless steel tubes, 20 ft in length.

With the necessary structural framing, the tower is self-supporting for outside use. A 50 or 100 kva transformer with a 66,000-v secondary output, plus a high-voltage mechanical rectifier and necessary primary and secondary resistance banks are included. It's easy to see that this unit—together with the firebox—will have a substantial cost.

Despite this, an installation of this type offers many advantages. It can be put into operation by the push of a button, with no waiting period. It's easy and inexpensive to operate and maintain. It requires no special skill in normal operation. And it will unquestionably do an outstanding job in eliminating scrapyard burning as a source of air pollution.

Operating Costs—So much for types of equipment. How about the economics of scrapyard operation in a no-smoke age?

The unit just described, with the 8 x 8 x 20 ft firebox, will likely cost between $22,000 and $35,000 installed, depending on the type of control employed. The normal car body takes 20 to 27 minutes to burn out. Figure production at about 10 car bodies per eight hours. Initial investment, plus unit labor costs, might therefore reach uneconomical levels.

What's the alternative to every scrap dealer investing in high-production, high-efficiency burning equipment? Let's look to what has happened with hydraulic baling presses for an answer.

Foreseeable Trend—Presses have kept getting larger and more costly until today it's not unusual for a complete installation of the largest size press to cost half a million dollars. Certainly not all or even a high percentage of scrap dealers have gone in for this type operation. But there are more every year.

Yet the small press operator still has his place, as does the operator who does not own a press. Probably much the same thing will happen in car body incineration. The large operator will install the best and lowest-labor-cost type of equipment, which will burn at low unit operating cost and will eliminate smoke completely.

A long, conveyor-equipped, adequately-controlled tunnel kiln—which such an installation would require—would obviously cost plenty to install.

Not Much Choice—Yet the large operator is going to have to put in the burning equipment. This to protect his already-large investment in presses and handling equipment, as well as to insure the steady flow of car bodies needed to keep one of the late-type large presses running at anywhere near capacity.

Gradual price readjustments to cover burning will help offset these costs. Too, prospects for a rapidly rising volume of business seem bright. Currently, cars are being scrapped at around a 4½-million annual rate. But some sources predict a car and truck population of 100-million in the not-too-distant future. Using an eight-year life cycle would suggest a potential scrapping rate of more than 12-million cars and trucks per year.

At this rate, production-line methods will be as necessary to car scrapping as they are to car production.

SAE Maps Out Main Areas For Improving Production

Everybody would like to do things better. But where do you begin?

Trick is to keep abreast of areas where progress has been made. Then check the potentially-most-profitable areas against your needs.

Here are some of those areas, as outlined for SAE members recently.

▪ You hope to help improve product quality, reduce costs, improve working conditions for your firm. Where can you direct your energies most effectively?

Shown on the chart are the broad areas of investigation suggested to members of SAE at the annual Production Forum at Buffalo. Suggestor was G. R. Fitzgerald, of GM's process development group. Mr. Fitzgerald was recently named chief engineer, AC Spark Plug Div.

Generally, the suggestions add up to keeping a receptive eye out for new or improved materials, tools and techniques.

Many Benefits—Take cold extrusion. This technique, he pointed out, offers the possibility of (1) reduced materials requirements, (2) lower cost material, (3) improved physicals with less alloy, (4) reduced machining, (5) better finish, (6) closer tolerances.

Slow progress in this field, he said, may be due to lack of experience or the need to develop tooling and process equipment from scratch. If cold extrusion is studied with more than one product in mind, it may become much more attractive. Among products GM's Tech Center now cold-extrudes successfully are spark-plug shells, piston pins and throwout bearings.

Can Coatings Help?—New coating methods for giving inexpensive materials improved resistance to wear, heat and corrosion are worth investigating, Fitzgerald said. Example is a jet engine part. Formerly made of stainless and difficult to machine, the part is now made of lower-cost material and is then nickel-phos coated.

Metal adhesives won't replace conventional joining methods like welding and brazing, the speaker said. But their use for applications like joining die castings and attaching automotive trim is almost sure to increase.

Put Chips To Work—The idea of converting chips directly into parts presents a number of problems. But GM has done this successfully for at least one simple extruded part. Chips are washed and crushed. No binder is required. Low C chips, for example, were heated to 1500°F and extruded.

Another highly profitable area potentially, though it's frequently neglected, is that of training engineers specifically for the job of improving methods.

No-Hands Assembly—Mechanical assembly is growing to a point where a single GM Div. now has more than 100 automatic and semi-automatic assembly machines. One at AC Spark Plug Div., which assembles 2400 spark plugs an hour, has worked at 93 pct efficiency.

Many plants have abandoned batch handling of materials for continuous flow processing, particularly where the move permits cutting down inventories in process. Fitzgerald believes electronic computers can cut costs further.

Feedback's Future — Electronic feedback principles, particularly in grinding, have already found wide application. Fitzgerald foresees wider use, including single-point turning applications and the use of instrumentation for detecting noises to prevent production of faulty parts. Radioactivity and ultrasonics will grow in use.

Cut Maintenance—Also worth checking are static machine controls that eliminate moving electrical parts. Tests in one case showed only two failures in 10-million cycles, whereas conventional relay failures started at 3-million cycles.

Cookie-cutter dies are helping reduce tooling costs.

CHECK WHETHER YOU CAN:

1. **Utilize materials more efficiently.**
2. **Adopt new coating processes, to make possible the use of less expensive coating materials, particularly for heat and corrosion.**
3. **Substitute new adhesives for other joining methods for some applications.**
4. **Somehow turn waste materials into finished parts.**
5. **Set up a program for training methods engineers.**
6. **Improve on your present materials-handling methods.**
7. **Make use of the new cutting tools.**
8. **Take further steps to improve the quality of your products.**
9. **Use new, no-moving-parts electrical controls to cut maintenance expense and downtime.**
10. **Bring down your tooling costs.**

Should Job Shop Platers Automate?

By **Julian Nelkin**—President, Nelkin Cad-O-Matic Corp., New York.

Productivity among job shop platers has jumped at least 25 pct in 10 years.

Automation helped do this. Even small, independent shops now profitably plate 2 to 50 lb batches on automatic equipment.

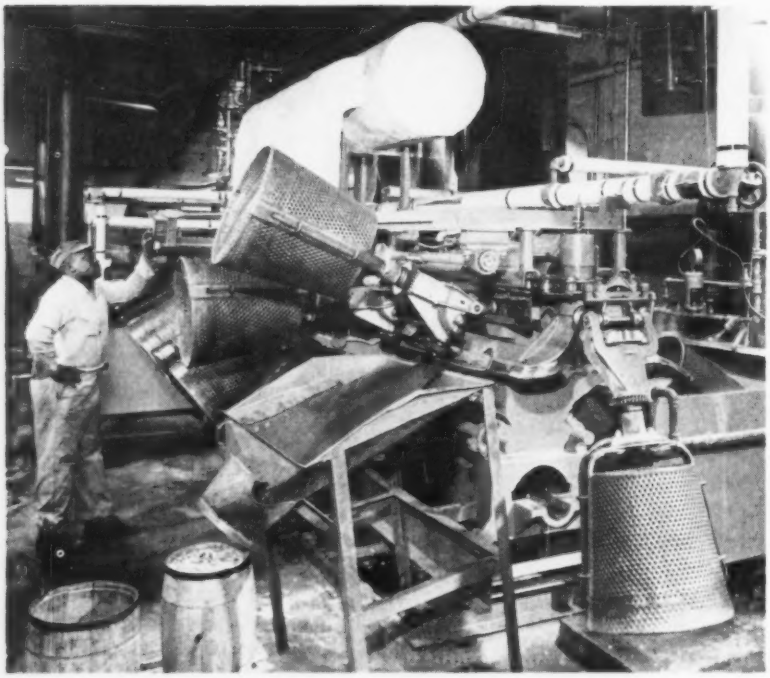
Profitably for this small plater means rejects down 80 pct, production up 330 pct.

▪ Continuous plating setups can brighten a dull and gloomy profit picture. To big platers, this no longer is news. But today it applies to small job shops and captive plating departments in addition.

You may argue to the contrary. Automation is fine for big platers, you may say. But the feeling prevails that most small job shops would take a lifetime to pay off automated equipment costs out of profits.

A few years ago, that argument had merit. But no longer. At least, not for the average shop.

Electroplating suppliers a while back took a keen look at small job shops and captive plating departments. They liked what they saw there. A spate of new equipment resulted. Much of it is designed just for plating of small batches, continuously and automatically.



READY TO SHIP: Plated parts unload directly into palletized kegs. By plating just the thickness specified, you save cadmium metal. This can mean saving the customer up to $50 per 10,000 lb of plated parts.

Small Lots—With such machines, you can plate even 2-lb batches of small parts at a profit. Conventionally, barrel loads run higher—even in job shops: perhaps 20 to 50 lb and more.

You can do this with much closer control of film thickness than common in small plating shops. Electroplating rejects are fewer, while production zooms.

Platitudes, you say? Not at all.

Take one East Coast plater, perhaps typical of many job shops. Formerly, the Nelkin Cad-O-Matic Corp., New York, required 6 men and 6 barrel plating machines to turn out 12,000 lb of small cadmium-plated parts in 10 hours.

Happier Workers—Now 3 men do the same in 6 hours. And operators like the new equipment. It eliminates transfer of heavy loads from one barrel to another. Workers who started with the machine are still there. This contrasts with the high rate of employee turnover on the prior plating line.

Production increase here is 330 pct. This with 1 pct rejects, down from a 5 to 6 pct earlier figure. After one year's service, there's been no downtime for maintenance or repairs yet.

Automatic continuous plating equipment makes this possible. Fredrick B. Stevens, Inc., Detroit, supplied and installed the plating line.

Deciding whether or not to invest wasn't easy for Nelkin. Your own decision will be just as tough to make. Too much money tied up in machines has meant no profit for

more than one plater. But Nelkin bought, and made the automated line pay for itself.

What It Makes — The 47-year old firm plates brass, copper, nickel, chromium and cadmium decorative and protective films on a variety of small parts. These include steel and malleable iron fastenings, such as screws, nuts, bolts and rivets. It also plates, (1) automotive parts, (2) radio and television components, and (3) such household items as can openers, picnic jugs, stapling machines and electrical fittings.

In the past, 6 conveyorized barrels handled cadmium plating. Each barrel was a separate machine.

Barrels were shifted from machine to machine in the plating cycle. That involved much loading and unloading of batches. It took 6 barrels with 6 men to turn out 12,000 lb of cadmium-plated parts in a 10-hour workday.

Earlier Cost—Each Bakelite barrel used before cost $1350. Counting accessory equipment, total investment on the former cadmium plating line ran more than $10,000.

Electroplated cadmium films with the former setup could range from 0.00001 to 0.0003 in. above or below specifications. Operator fatigue, or even lack of interest, accounted for much of this variation. Rejects averaged 5 to 6 pct. Downtime ran about 10 pct with each machine.

Automated cadmium barrel plating equipment stacks up well against such a list of prior troubles. Continuously operating, the line cycles work in spinning barrels through cleaning, plating and drying stages. Part transfer is eliminated.

Plastic Barrels—Each of the 39 barrels measures 20 in. deep, and 18 in. diam at the lower end. It tapers to 15 in. diam at the mouth.

Perforations in the 12 Lucite barrels are 3/32 in. diam. In the 27 plastisol barrels, holes range between 3/16 and ¼ in. diam. Smallest screws plated are 4-40 NC (0.1120 in. OD).

Small parts drop into the open barrel mouth through a hopper. Load weight is controlled within 5 pct.

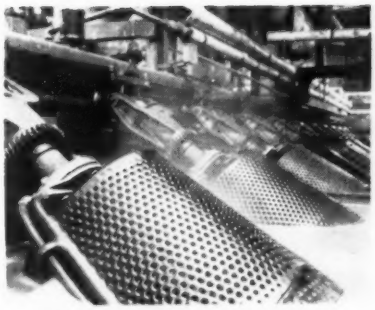
Normal batch size runs from 20 to 45 lb. Economically, batches weighing as little as 2 lb can be plated. The machine will handle 1000-lb lots without trouble.

After loading, a roller chain conveyor moves the barrel toward the cleaning bath.

A roller on the barrel lift arm passes over a hump cam. This elevates the loaded barrel over the tank side, and drops it into the first solution. Hump cams raise and lower the barrel in and out of each bath as it progresses around the semicircular plating line.

Barrels Spin—As the small parts submerge in any one bath, a worm gear on the barrel spindle engages a spinning worm drive. This rotates the partially immersed barrel. Complete cleaning and uniform plating result.

Electrolytic cleaning, cyanide dip and plating baths all require electric current. A cathode track supplies this. It runs around the plating line a few inches above the cam roller track. The barrel lift arm travels on this latter track.



BATCH PLATED: Barrels progress automatically around 80-ft long hairpin-shaped plating line. Cadmium thickness runs 0.00001 to 0.00005 in.

Electricity passes from the cathode track through a contact shoe into the barrel spindle. Cathode contacts (called danglers) screwed to the spindle then carry current down the outside of the nonconductive barrel, and into its interior.

Test Baths — Solution temperature is controlled by steam coils. Solution makeup is checked daily. Cadmium bath is replenished each shift.

Corrosive and toxic vapors from the baths exhaust to the roof through a 1000 cfm blower. Protective finishes on the ducting guard against attack by the fumes.

Plating thickness depends only on cycle time. Solution makeup and other conditions remain constant. After the operator sets the dials, plating proceeds automatically. Electroplating cycle can be changed every 10 barrels, if necessary, to meet customer specifications.

Typical Cadmium Barrel Plating Cycle

Operation	Soak clean	Alkaline clean	Wash	Acid dip	Wash	Cyanide dip	Cadmium plate	Wash	Bright dip	Wash	Wash	Dry	Oven bake (optional)
Conditions	Emulsion type at 100–120° F	Reverse electrolytic bath, 8 oz/gal 170° F	Cold water	25 pct HCl with inhibitor 100–120° F	Cold water	4 oz/gal NaCN, 90° F No special safety precautions	CdO–4 oz/gal NaCN–16 oz/gal Brighteners Cast Cd ball anodes in cages; 70–95° F 15v, 2500 amp	Cold water	Conversion coating $HCrO_4$, 8 oz/gal	Cold water	150–170° F water	Gas-fired heater-blower	With stressed steel parts to avoid hydrogen embrittlement 300° F, 3 hours
Elapsed time, minutes	3	6	8	13	16	19	42	45	48	51	53	60	(240)

Sodium Process Extracts Titanium In Commercial Tonnages

GRANULES: Titanium in form of tiny granules is shipped to pelletizing equipment.

By **John Milton**—Consultant, New Milton, England

Titanium prices dropped 10 pct in 1956. Further cuts will depend in part on better ways of extracting the metal from its ores.

Use of sodium for recovery of titanium has several advantages. One is the prospect of continuous processing at high yields.

Two firms now produce raw titanium in commercial tonnages by the sodium reduction process.

▪ You may have been waiting for the right moment to use titanium in one of your products. If so, keep an eye on the mill producers and melters.

It's reported that producers have cost-cutting measures in the works that promise to bring prices within reach of important commercial markets.

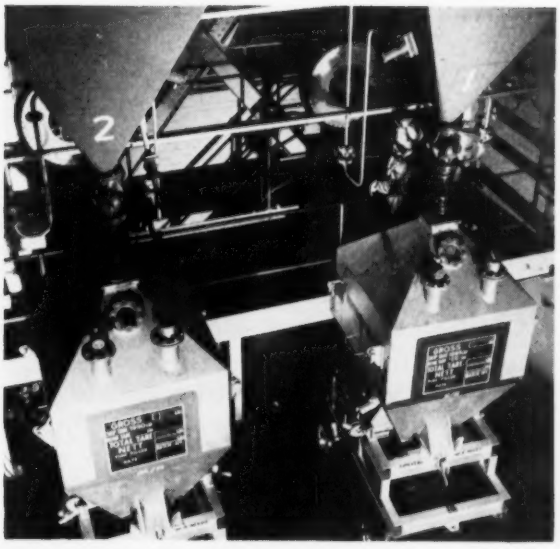
Melters too speak of plans for larger ingots (up to 10,000 lb), better handling setups, and improved melting methods. In addition, there's the prospect of improved ways of extracting titanium from its ores.

Not Sponge—The Wilton, England, plant of General Chemicals Div., Imperial Chemical Industries, Ltd., now produces at least 1500 tons of raw titanium yearly by sodium reduction. The process differs from the standard Kroll process, in which magnesium serves as the reducing agent.

Instead of coke-like sponge titanium, sodium reduction as practiced by I.C.I. results in small powder granules. These granules can be pelleted with alloying materials into a form better suited for the difficult melting process.

General Chemicals concerns itself chiefly with such industrial compounds as sulphuric acid, chlorine and caustic soda. It also

ADD ALLOYS: Raw titanium granules mix with alloying ingredients in the double cone mixer seen in the background. Rotary pellet machines then compact the mix into ½ x ½ in. pellets.



PULVERIZED: Bunkers collect titanium from melt grinding system. Melt is weighed off into skips and moved to next stage of process.

TITANIUM PRODUCED TWO WAYS

▪ Commercially, two ways now exist to produce titanium. Both extract titanium dioxide from rutile and titaniferous ores. Both react titanium dioxide with chlorine gas to form titanium tetrachloride.

From there on, they differ.

Magnesium reacts with titanium tetrachloride to produce raw titanium metal in the Kroll process. Ten of 12 titanium producers throughout the world are known to recover the metal this way.

Sodium reacts with titanium tetrachloride to form raw titanium in the second process. Presently, only two producers report using this method on a commercial scale. One is Electro Metallurgical Co. at its Ashtabula, O., plant. The other is Imperial Chemicals Ltd., Birmingham, England.

turns out thousands of tons of metallic sodium each year.

Explosion-prone—Essentially, the sodium process is not new. Titanium was first isolated by the method. But earlier workers thought large scale sodium - titanium compound reactions would run out of control. Titanium made this way, they felt, would lack the properties needed for good quality massive ingots.

Sodium readily catches fire. It also reacts explosively with water. So handling sodium safely also would prove a problem.

Laboratory work at I.C.I. showed all these drawbacks didn't hold true. Potentially at least, reducing titanium tetrachloride by sodium was attractive, cost-wise.

Process Feasible—A 7-lb experimental plant at the firm's Widnes Research Laboratory confirmed the point. The reaction proved successful and cheap on a small scale.

Titanium as first produced did not attain the required ductility. This resulted chiefly from trouble in excluding oxygen at various stages. Sources of contamination were finally tracked down and eliminated.

A 100-lb batch titanium plant followed, then a 900-lb reactor.

Prototype Built — This last enabled I.C.I. to predict the behavior of a commercial-size reactor. Favorable reports on the metallurgical properties of the sodium-reduced titanium encouraged building a large plant.

Difficulties were not yet over. Design work at one point was held up while problems in the reaction and separation stages were solved.

Melting near 3100°F, titanium presents many technical processing posers.

It resists oxygen and nitrogen poorly above 800°F. So titanium cannot be melted in air. Impurities even in small amounts harden the metal, and make it less malleable.

Exclude Air — All this means melting under vacuum, or a blanket of argon or helium.

Complicating melting practice even further, molten titanium combines with all known refractories. Contamination to a greater or lesser extent results too from this source.

Several melting methods help overcome such difficulties. One employs a consumable titanium electrode. The process builds up the ingot by progressive melting of a titanium electrode.

Pellets do not feed into the crucible. Instead, titanium is compacted into a block.

Pressed Electrode—This titanium block serves as the electrode. Unlike the graphite electrode, the pressed titanium is not cooled. Consequently, it melts on striking the arc.

An alternate method of melting is used at times. The second technique calls for an electric arc in a water-cooled copper crucible. The electrode enters through a sealing gland in the gas-tight lid.

First, an electric arc is struck between a graphite electrode and a few titanium powder pellets in the bottom of the crucible. The electrode mounts in a water-cooled holder.

Cast Ingot — Additional pellets feed into the crucible after the first lot melts. A special feeding device controls this.

The ingot grows slowly. As it

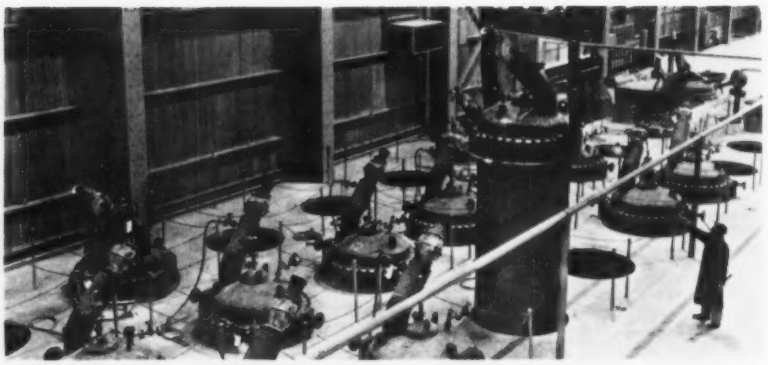
FIRST U. S. PLANT REPORTED

▪ Sodium reduction of titanium compounds has reached the commercial stage in the United States as well as abroad.

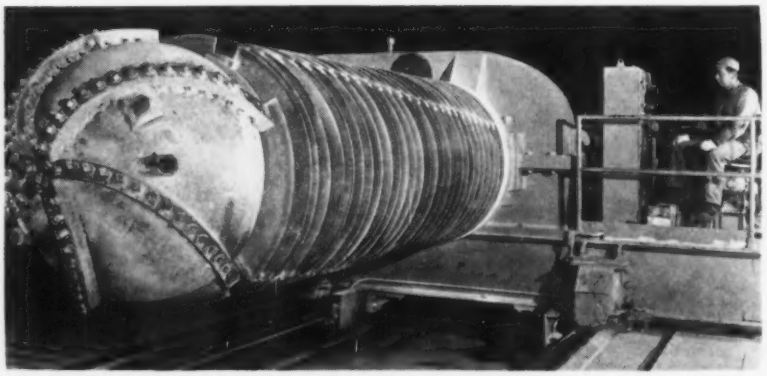
Electro Metallurgical Co., New York, operates a plant using this process at Ashtabula, O. Its rated capacity is 7500 tons of titanium sponge annually. Reportedly, this is the nation's largest titanium sponge plant right now.

The Ashtabula works went into continuous production at full capacity less than nine months after the first heat. Capacity output has been maintained for periods of 45 days and longer without shutdown.

The plant is said to be the first in the United States to produce titanium metal by sodium reduction on a commercial scale.



SODIUM-REDUCED: Sodium-titanium reactor bomb is lowered into cooling station here. The Ashtabula, O., plant of Electro Metallurgical Co. is reported the first to use sodium reduction commercially.



ROTARY BREAKER: Product removal machine, somewhat akin to equipment used in mining ore, loosens mixture of salt and titanium sponge clinging to side of a reactor. Sponge separation and refining follow.

Continued from Page 121

builds up, the graphite electrode is gradually raised.

Special devices and techniques reduce both melt and ingot contamination. Carbon in the electrode is one source of impurities.

Regular production of 400-lb ingots now is past history. Ingots weighing 2000 lb will be routine. Facilities will be able to handle 4000-lb ingots, as and when required.

Smooth Surfaces—After casting the ingot, its surface is dressed to remove surface blemishes.

Heating of the ingots in an electric furnace helps reduce hydrogen contamination, such as might be met in gas-fired furnaces. All this enables forging the ingot into a slab, later rolled into sheet or barstock.

Reheating to forging temperature must be done with extreme care, due to oxidizing of the ingot surface. This oxidized layer is removed after forging.

Dressed Again—Following machining of the titanium slab to remove any oxidized layer, it is again reheated.

Hot rolling of the 24 x 24 x 2-in. slab takes place in a reversing mill. This operation reduces slab thickness to about 1/5 in.

Hot-rolled sheet is cleaned in one of three ways: (1) in special chemical baths, (2) by shot blasting, or (3) by scouring with abrasive.

Cold rolling then further reduces slab thickness to that required. This may be as thin as ten thousandths of an inch.

All this is not easy to do. Titanium and its alloys do not lend themselves to cold rolling.

Moreover, the metal becomes progressively stronger and less ductile as cold rolling proceeds. Annealing at carefully determined intervals helps cure rolling troubles.

Cold rolling at first was carried out on mills built for copper and brass rolling. A new plant solely for rolling titanium and titanium alloys will be located at Waunarlwydd Works, Swansea, South Wales.

In addition to research and development concerned with working titanium, ICI's Metals Division is exploring properties of the metal and its alloys that may broaden uses outside the aircraft industry. Much of the current effort is in the field of corrosion.

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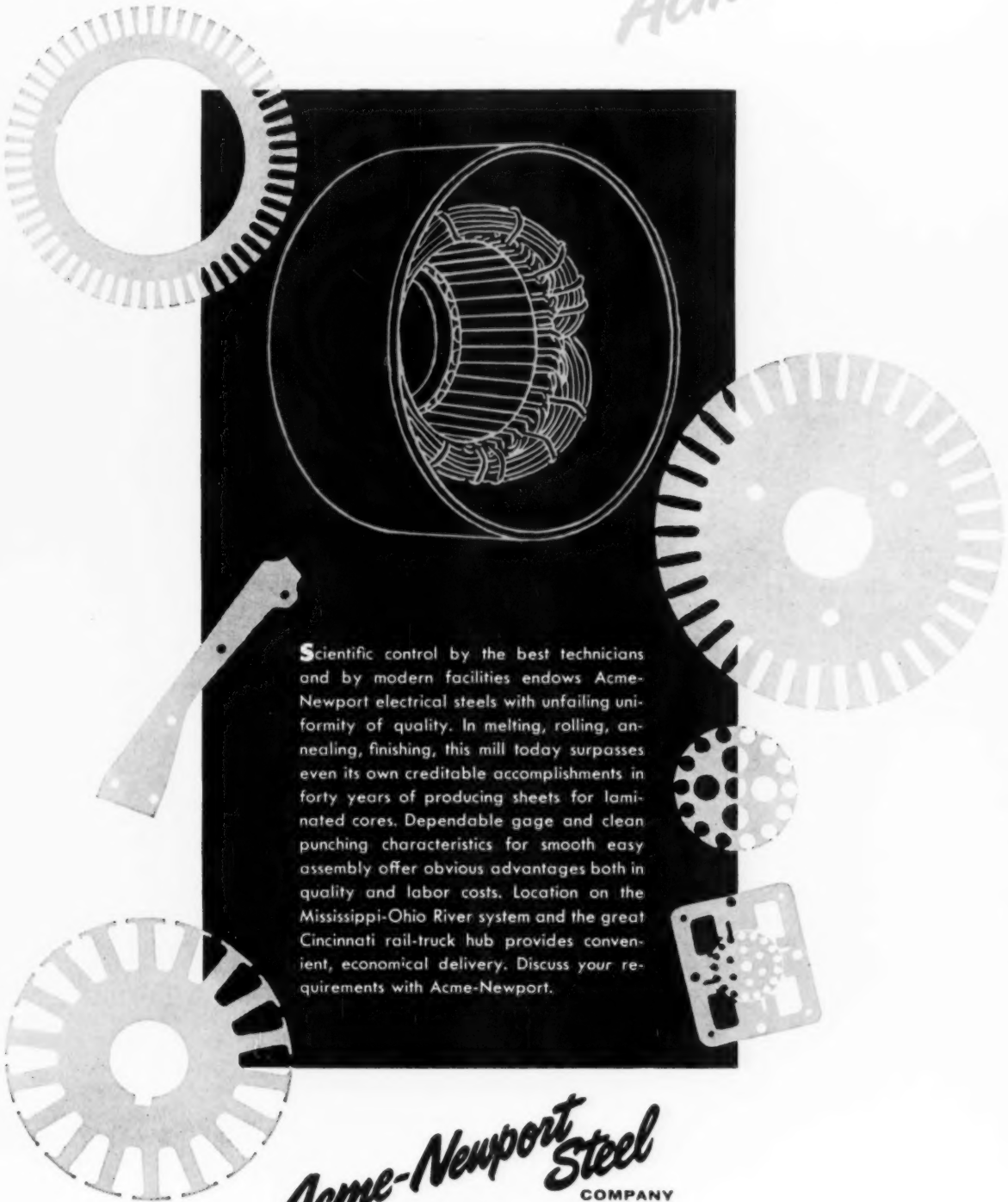

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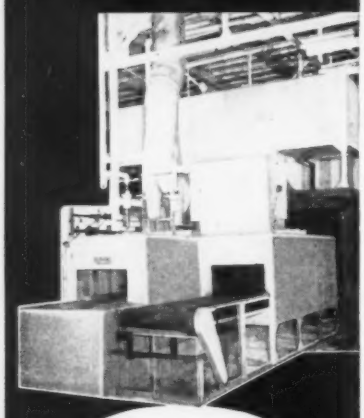

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FREE TECHNICAL LITERATURE

New Catalogues And Bulletins

Money-saving products and services are described in the literature briefed here. For your copy just circle the number on the free postcard, p. 129.

Gear Hobber

Tandem gear hobbers for tailoring gear output to need are described in an 8-page bulletin. It details design, construction and operation. (Michigan Tool Co.)

For free copy circle No. 1 on postcard, p. 129

Electrospark Machine

Application of the method-X process of electrospark machining to a new style vertical machine is described in a bulletin. (Ex-Cell-O Corp.)

For free copy circle No. 2 on postcard, p. 129

Highway Aluminum

Aluminum highway products are the subjects of a 20-page brochure. It details design, construction and installation data for bridge railings, extruded highway signs, sign blanks and accessories. (Kaiser Aluminum & Chemical Sales, Inc.)

For free copy circle No. 3 on postcard, p. 129

Machining Stainless

Pocket-size, a slide chart offers data on machining stainless steels. On one side it gives information on turning, drilling, tapping, threading, milling and reaming operations. It tabulates speeds and feeds, and gives special notes on drilling, tapping, lubrication welding. The other side shows relative workability of stainless steels, including blanking, deep drawing, stamping, forging, heading, roll threading, welding, etc. (The Carpenter Steel Co.)

For free copy circle No. 4 on postcard, p. 129

Welding Control

Standard - line non - synchronous control for resistance welding is the subject of a 12-page bulletin. It describes the control and discusses a variety of available combinations. Also explained is the use of plug-in control units and ignitron contactors. (General Electric Co.)

For free copy circle No. 5 on postcard, p. 129

Gas Chromatograph

Industrial gas chromatographs are described in a 4-page brochure. It tells about an instrument which brings the simplicity and dependability of gas chromatography to process instrumentation. (Beckman Instruments, Inc.)

For free copy circle No. 6 on postcard, p. 129

Oil Remover

A technical data sheet describes a general purpose cleaner to remove oils from steel, brass and base metals. The cleaner is mildly alkaline and has a high percentage of wetting agent. (MacDermid, Inc.)

For free copy circle No. 7 on postcard, p. 129

Contour Saw

The unique principle of guiding the tool instead of the work is explained in a 4-page brochure. It describes a new contour sawing machine which makes complex cuts

over a working area of 70 sq ft while the work remains stationary. (The DoALL Co.)

For free copy circle No. 8 on postcard, p. 129

High Strength Steel

A steel company's new folder gives data on their "M" grade. This high strength steel is a manganese-copper grade. It offers high strength, resistance to abrasion and fatigue plus moderate formability and weldability. (Republic Steel Corp.)

For free copy circle No. 9 on postcard, p. 129

Forming, Cutoff Units

Automatic forming and cutting-off machines are described in a pair of bulletins. These illustrate two new versions of a company's automatic screw machine. One is for fast forming and cutting-off operations; the other does all automatic operations except threading. (Brown & Sharpe Mfg. Co.)

For free copy circle No. 10 on postcard, p. 129

Oiltight Pushbuttons

Designed for accessibility of wiring, appearance and flexibility, new heavy duty oiltight pushbuttons are covered in a 32-page catalog. It lists units rated to 550-v ac-dc. (Furnas Electric Co.)

For free copy circle No. 11 on postcard, p. 129

Strip Conductor

Design advantages of interleaved aluminum strip conductor in electro-magnetic coils are outlined in an 8-page brochure. (Reynolds Metals Co.)

For free copy circle No. 12 on postcard, p. 129

Magnetic Clutch

Dimensional drawings in a folder picture a magnetic clutch. The publication describes the unit as "the world's finest magnetic clutch." (Fawick Corp.)

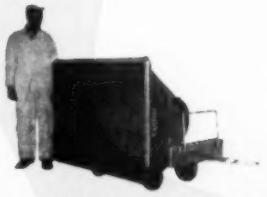
For free copy circle No. 13 on postcard, p. 129

Milling Cutters

A 4-page bulletin covers cutters with locking wedges for milling

Rocker Dumps

RD CARS to any capacity for any track gauge for manual or locomotive hauling. Custom-built.



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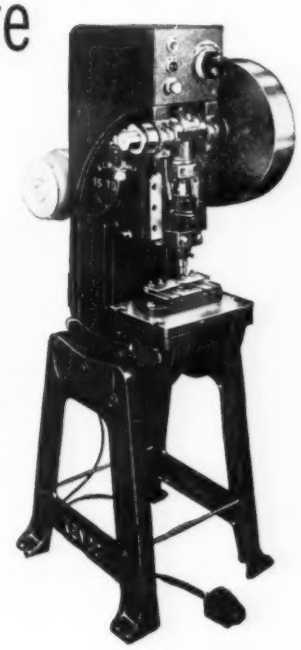


Single-trip control buttons are widely spaced, to keep hands clear of the danger zone. Operators must push *both* buttons at once... hold them until stroke reaches bottom, then release both buttons to start new cycle. Fail-safe operation. Impossible to "fudge." Impossible for press to double trip.

Versatile controls—You can change from "single trip" to "continuous stroke," or "inching" by merely turning a dial. You can change timing in seconds. No flywheel... no clutching. Write for details.

KENCO MANUFACTURING CO. *5211 Telegraph Road, Los Angeles 22, Calif.*

Malleabrasive reduces overall cleaning costs as much as 50% because—

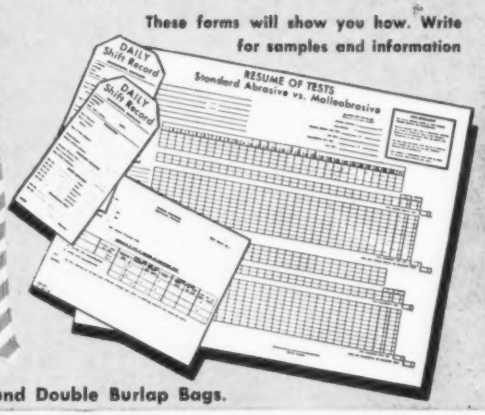
- It wears 2 to 4 times longer than ordinary shot and grit.
- It increases output of cleaned castings.
- It reduces wear on machine parts and cuts machine down time.

These are not just claims. You can prove these savings right in your own plant, in your own machines. We supply all the necessary forms and instructions.

Malleabrasive has reduced costs in more than 800 plants. Why not yours?

make your own 30 day test...

These forms will show you how. Write for samples and information



In easy to handle 50-pound Double Burlap Bags.

MALLEABRASIVE

THE GLOBE STEEL ABRASIVE CO., MANSFIELD, OHIO ®

1907—Fiftieth Anniversary—1957

FREE LITERATURE

with square and triangular indexable "throw-away" carbides. It describes the design and construction of the cutters and lists dimensions and other specifications. (McCrosky Tool Corp.)

For free copy circle No. 14 on postcard, p. 129

Worm Gear Drives

Facts on worm gear drives appear in a booklet. Its 16 pages provide useful information on speed reducers, worm gear sets and special units. (Cleveland Worm & Gear Co.)

For free copy circle No. 15 on postcard, p. 129

Press Brakes

In 16 pages, a catalog illustrates construction features of a firm's press brakes. It gives specifications of brakes in the 30, 36, 50, and 60-ton capacities. (Dreis & Krump Mfg. Co.)

For free copy circle No. 16 on postcard, p. 129

Centrifugal Collector

Centrifugal collectors are illustrated and described in a folder. It details two new-design types, and lists industrial air cleaning and dust collection applications of each. (Kirk & Blum Mfg. Co.)

For free copy circle No. 17 on postcard, p. 129

Stainless Bar, Wire

Stainless steel bar and wire is the subject of a new 24-page booklet. It describes 45 types available, including several special proprietary grades. Advantages, properties, fabrication, electropolishing, ebonizing, and supply information are also included. (Armco Steel Corp.)

For free copy circle No. 18 on postcard, p. 129

Gas Container Welding

Resistance welding of butane gas containers is analyzed in an engineering report. It's divided into two parts: (1) flash-butt resistance welding and (2) metallurgy. (Sciaky Bros., Inc.)

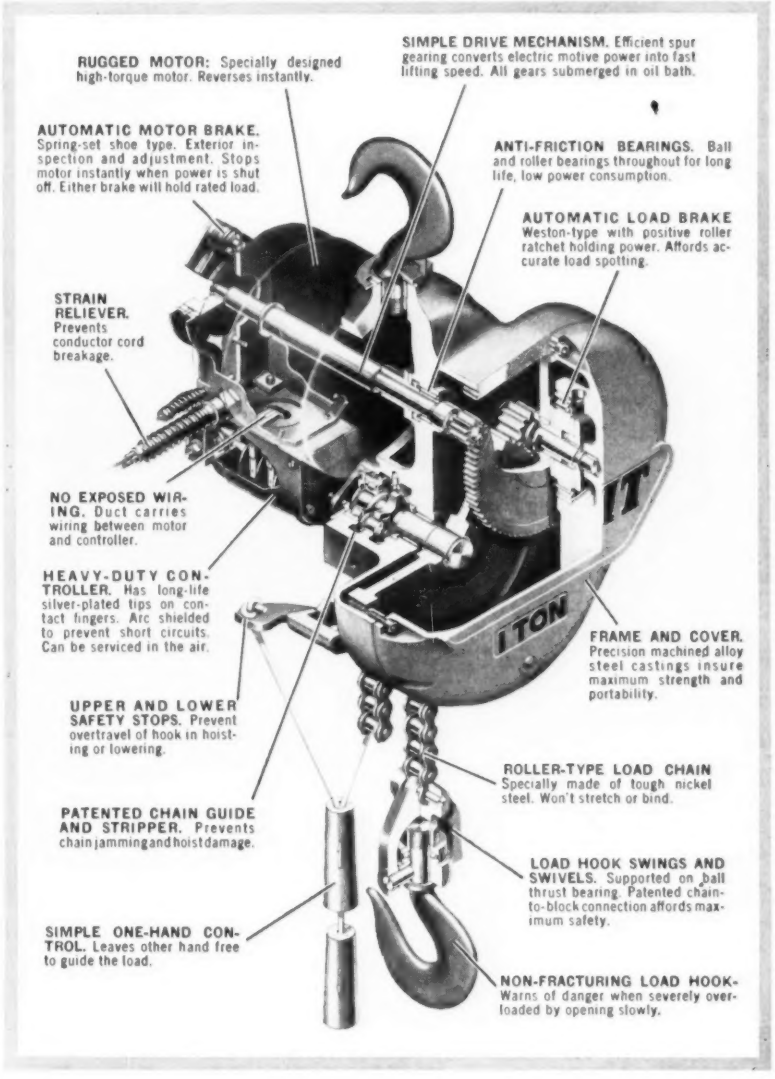
For free copy circle No. 19 on postcard, p. 129

CLOSE LOOK AT 'Budgit'®

. . . THE MOST WIDELY USED ELECTRIC HOIST

There is no substitute for the economy of quality. That is why the 'Budgit' Electric Hoist is by far the No. 1 hoist in its class. Superb quality inside and out assures: 1) consistently high performance; 2) all-day operation on just a few cents' worth of electricity; 3) long service life with little maintenance.

The 'Budgit' Electric Hoist is a complete hoist — comes ready to hang up, plug in and use. It is fast — a 500 lb. load can be lifted a foot in less than two seconds. It is safe — has every practical feature to protect operator, load and hoist. Capacities: ⅛ to 2 tons. AC and DC models. Also available for operation from one 12-volt or two 6-volt truck batteries — can be installed on utility trucks or used where there is no regular electric service. Prices start at $149. Get all the facts. *Ask your "Shaw-Box" Distributor or write us for Bulletins 402 and 404.*


RUGGED MOTOR: Specially designed high-torque motor. Reverses instantly.
SIMPLE DRIVE MECHANISM. Efficient spur gearing converts electric motive power into fast lifting speed. All gears submerged in oil bath.
AUTOMATIC MOTOR BRAKE. Spring-set shoe type. Exterior inspection and adjustment. Stops motor instantly when power is shut off. Either brake will hold rated load.
ANTI-FRICTION BEARINGS. Ball and roller bearings throughout for long life, low power consumption.
AUTOMATIC LOAD BRAKE Weston-type with positive roller ratchet holding power. Affords accurate load spotting.
STRAIN RELIEVER. Prevents conductor cord breakage.
NO EXPOSED WIRING. Duct carries wiring between motor and controller.
HEAVY-DUTY CONTROLLER. Has long-life silver-plated tips on contact fingers. Arc shielded to prevent short circuits. Can be serviced in the air.
1 TON
IT
FRAME AND COVER. Precision machined alloy steel castings insure maximum strength and portability.
UPPER AND LOWER SAFETY STOPS. Prevent overtravel of hook in hoisting or lowering.
ROLLER-TYPE LOAD CHAIN Specially made of tough nickel steel. Won't stretch or bind.
PATENTED CHAIN GUIDE AND STRIPPER. Prevents chain jamming and hoist damage.
LOAD HOOK SWINGS AND SWIVELS. Supported on ball thrust bearing. Patented chain-to-block connection affords maximum safety.
SIMPLE ONE-HAND CONTROL. Leaves other hand free to guide the load.
NON-FRACTURING LOAD HOOK. Warns of danger when severely overloaded by opening slowly.

'Budgit' I-Beam Trolley. Extends the operational range of the hoist. Adjustable to fit various I-beam sizes. Ball bearing equipped for smooth operation. Hand-geared type saves pushing effort. Capacities ¼-ton up.

'Budgit' Current Collector Assembly. For mounting on the 'Budgit' Trolley. Picks up current from bare copper trolley wire used to supply the hoist with power.

'Budgit' Conductor Cord Trolley. Used in any number to keep the conductor cord up and out of the way when the hoist is installed on a monorail. Equally suitable to hold cords on other devices aloft.

57A-11

MANNING MAXWELL & MOORE INC. MM&M TRADE MARK

'Budgit'® ELECTRIC HOISTS

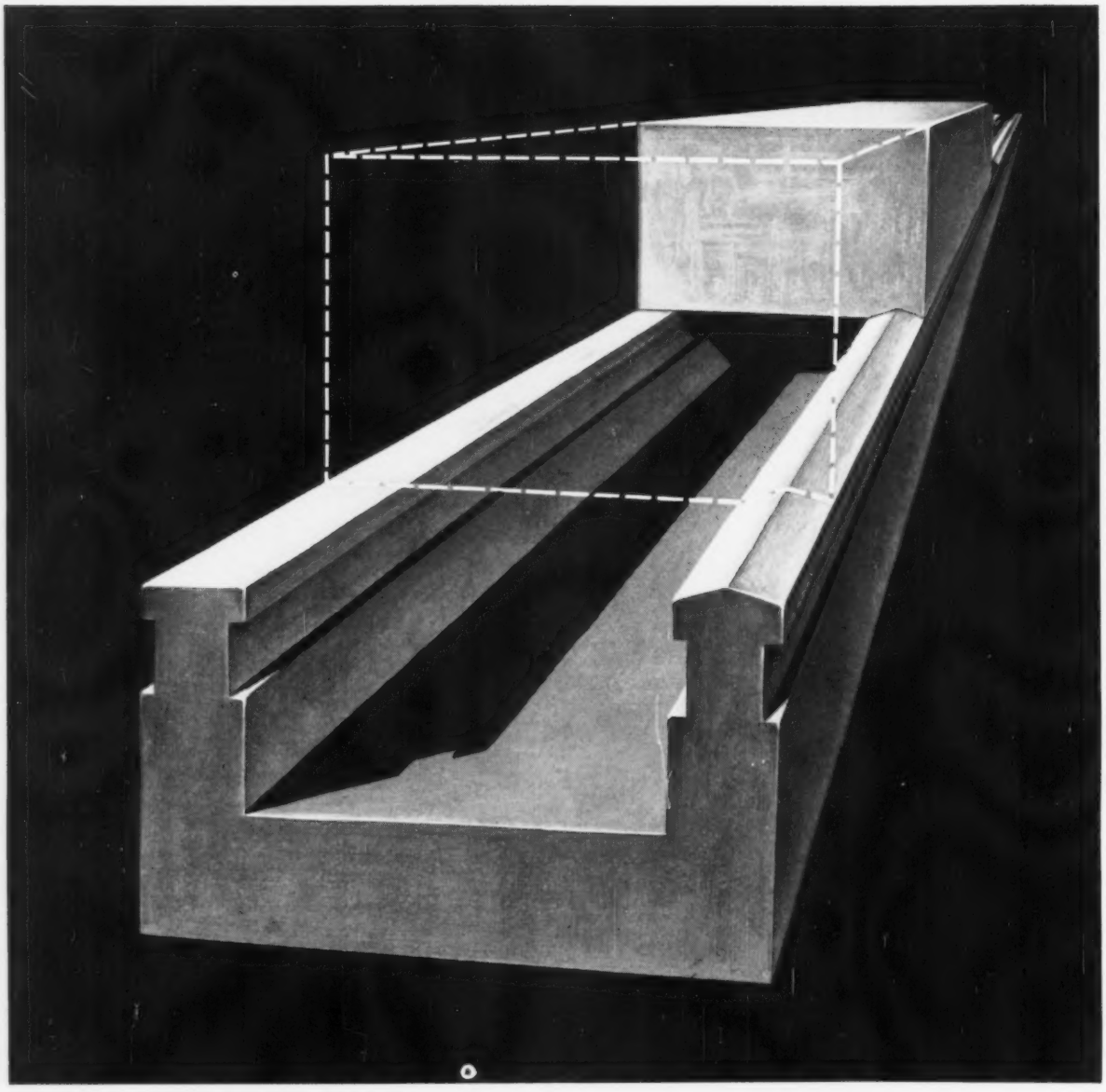
MANNING, MAXWELL & MOORE, INC.

SHAW-BOX CRANE & HOIST DIVISION

382 West Broadway • Muskegon, Michigan

Builders of "SHAW-BOX" and 'LOAD LIFTER' Cranes, 'BUDGIT' and 'LOAD LIFTER' Hoists and other lifting specialties. Other Divisions produce 'ASHCROFT' Gauges, 'HANCOCK' Valves, 'CONSOLIDATED' Safety and Relief Valves, 'AMERICAN' and 'AMERICAN-MICROSEN' Industrial Instruments, and Aircraft Products.

In Canada: *Manning, Maxwell & Moore of Canada, Ltd., Avenue Road, Galt, Ontario.*



for smooth, steady sliding way action

Febis K lubricants – specially formulated to prevent the irregular, stick-slip motion of slow-speed sliding ways in machine tools – are equally effective in higher speed operations. The special composition of Febis K lubricants gives them the unusual property of providing lower *static* friction than *sliding* friction. As a result, moving parts, starting with a low force, will not jump ahead. Febis K lubricants provide smooth, steady sliding action...assure better precision work. Febis K lubricants also help reduce wear because of their strong adhesion to sliding surfaces. And they have mild EP and rust-preventive properties. Febis K lubricants are available in *two* grades: *Febis K-53* – with the right viscosity for small- and medium-size machines; *Febis K-73* – for heavier machines and more heavily loaded machines. Both Febis K lubricants have passed the Cincinnati Milling Machine Company's stick-slip test and have been checked and approved by the Bijur Lubricating Corp. for use in their automatic lubrication systems. For further information contact your nearest Esso Standard Oil Company Division Office: Boston; Pelham, N. Y.; Elizabeth, N. J.; Bala-Cynwyd, Pa.; Baltimore; Richmond; Charlotte; Columbia, S. C.; Memphis; New Orleans.

FOR BETTER RESULTS

FEBIS K

Esso

PETROLEUM PRODUCTS

FREE LITERATURE

This section starts on Page 124

These publications describe money-saving equipment and services . . . they are free with no obligation . . . just circle the number and mail the postcard.

Stamped Metal

Specialists in skilled stamping since 1883 present a capsule view of themselves in an 8-page brochure. It covers their engineering, design, toolroom and metalworking facilities. (Worcester Stamped Metal).

For free copy circle No. 20 on postcard

Slurry Honing

Slurry honing machines for precision metal cleaning and finishing are described in a firm's data sheets. They picture typical installations, how units work. (Vacu-Blast Co., Inc.)

For free copy circle No. 21 on postcard

Hardness Testers

Portable hardness testers are detailed in a 4-page folder. The direct dial-read instrument tests hardness of any size, shape or type material. (Newage International, Inc.)

For free copy circle No. 22 on postcard

Bus Conductors

Properties and uses of aluminum bus conductor are discussed in a 280-page handbook. It contains 69 illustrations, presenting essential information in easy-to-read, readily useable form. (For free copy, write on company letterhead to Aluminum Co. of America, 793 Alcoa Bldg, Pittsburgh 19, Pa.)

LP-gas Exhausts

Removal of carbon monoxide and other air contaminants from exhausts of LP-gas-powered trucks by catalytic purifiers is described in a paper. (Oxy-Catalyst, Inc.)

For free copy circle No. 23 on postcard

Pipe Nipples

To cut confusion in the use of pipe nipples, a company now identifies its seamless steel, wrought iron and certain welded steel pipe nipples by roll indented markings and color tints. A catalog page covers this. (Pittsburgh Nipple Works, Inc.)

For free copy circle No. 24 on postcard

Boron Stainless

In 8-pages, a bulletin tells about a wrought austenitic alloy, 1-pct boron stainless steel. The material now is available in commercial quantities. (Superior Steel Corp.)

For free copy circle No. 25 on postcard

Snap Couplings

Quick-connect, quick-disconnect couplings are subjects of a data sheet. It describes field-tested units using Teflon seals throughout. The coupling handles acids, alkalies, solvents and high pressure steam. (Snap-tite, Inc.)

For free copy circle No. 26 on postcard

Stainless Equipment

Containing 40-pages, a report offers data on stainless steel for the textile industry. (Allegheny Ludlum Steel Corp.)

For free copy circle No. 27 on postcard

Electric Furnaces

Box-type electric furnaces for tool room applications appear in a bulletin. Advantages and performance data for six types are included. (Westinghouse Electric Corp.)

For free copy circle No. 28 on postcard

Lift Attachment

Quadruple lift attachments for extra high stacking with industrial lift trucks are described in a bulletin. The attachment provides for lifts up to 220 in. Yet it's designed for a minimum overall truck height

Postcard valid 8 weeks only. After that use own letterhead fully describing item wanted. 5/9/57

Circle numbers for Free Technical Literature or Information on New Equipment:

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31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
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If you want more details on products advertised in this issue fill in below:

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Your Name

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Title

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Company

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Co. Address

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City Zone

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State

FIRST CLASS
PERMIT No. 36
(Sec. 349 P.L.&R.)
New York, N. Y.

BUSINESS REPLY CARD
No postage necessary if mailed in the United States

POSTAGE WILL BE PAID BY

THE IRON AGE
Post Office Box 77
Village Station
NEW YORK 14, N. Y.

BUSINESS REPLY CARD
No postage necessary if mailed in the United States

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Company .....
Co. Address .....
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FREE LITERATURE

with the forks in the lowered position. (Yale & Towne Mfg. Co.)

For free copy circle No. 29 on postcard

Valves, Regulators

Completely revised, a condensed 28-page catalog covers meters, regulators and valves. (Rockwell Mfg. Co.)

For free copy circle No. 30 on postcard

Analyzers

Continuous carbon monoxide analyzers, adaptable to any set of individual requirements, are described in a 4-page folder. (Mine Safety Appliances Co.)

For free copy circle No. 31 on postcard

Hot Problems

High-temperature problems in process plants are discussed in a paper. It tells of the use of steel and its various alloys, and the mechanical and physical reactions of the materials under various temperature and corrosive environments. (Tubular Products Div., Babcock & Wilcox Co.)

For free copy circle No. 32 on postcard

Cut-off Machine

A brochure describes a new power cut-off saw. (The DoALL Co.)

For free copy circle No. 33 on postcard

Hydraulic Cylinders

Recent improvements in design and additional mountings for a firm's compact hydraulic cylinders appear in a bulletin. (Vickers, Inc.)

For free copy circle No. 34 on postcard

Precision Lathe

Fast set-up and turning time for close tolerance manufacturing operations is claimed for a new lathe in a 20-page bulletin. It describes the lathe as the only one of its class in the world. (For free copy write on company letterhead to Monarch Machine Tool Co., Sidney, Ohio.)

Fire Detector

A 12-page brochure describes a rate-of-temperature-rise fire detector. (Walter Kidde & Company, Inc.)

For free copy circle No. 35 on postcard

Sealers

Polysulphide-rubber-base sealers are described in a 4-page catalog. It says these materials are designed for use where durability, flexibility and strength are important factors. (Adhesives and Coatings Div., Minnesota Mining and Mfg. Co.)

For free copy circle No. 36 on postcard

Steel Belt Conveyor

Steel belt conveyors appear in a bulletin. It explains how V-ropes bonded to the underside of steel conveyor belts travel over grooved sheaves to maintain proper belt alignment. (Sandvik Steel, Inc.)

For free copy circle No. 37 on postcard

Gearing

Industrial gearing is discussed in a dozen page booklet. It outlines design and manufacturing facilities of a gearing producer. Specialized machinery and heat-treating equipment are shown. (Westinghouse Electric Corp.)

For free copy circle No. 38 on postcard

Carbide Tools

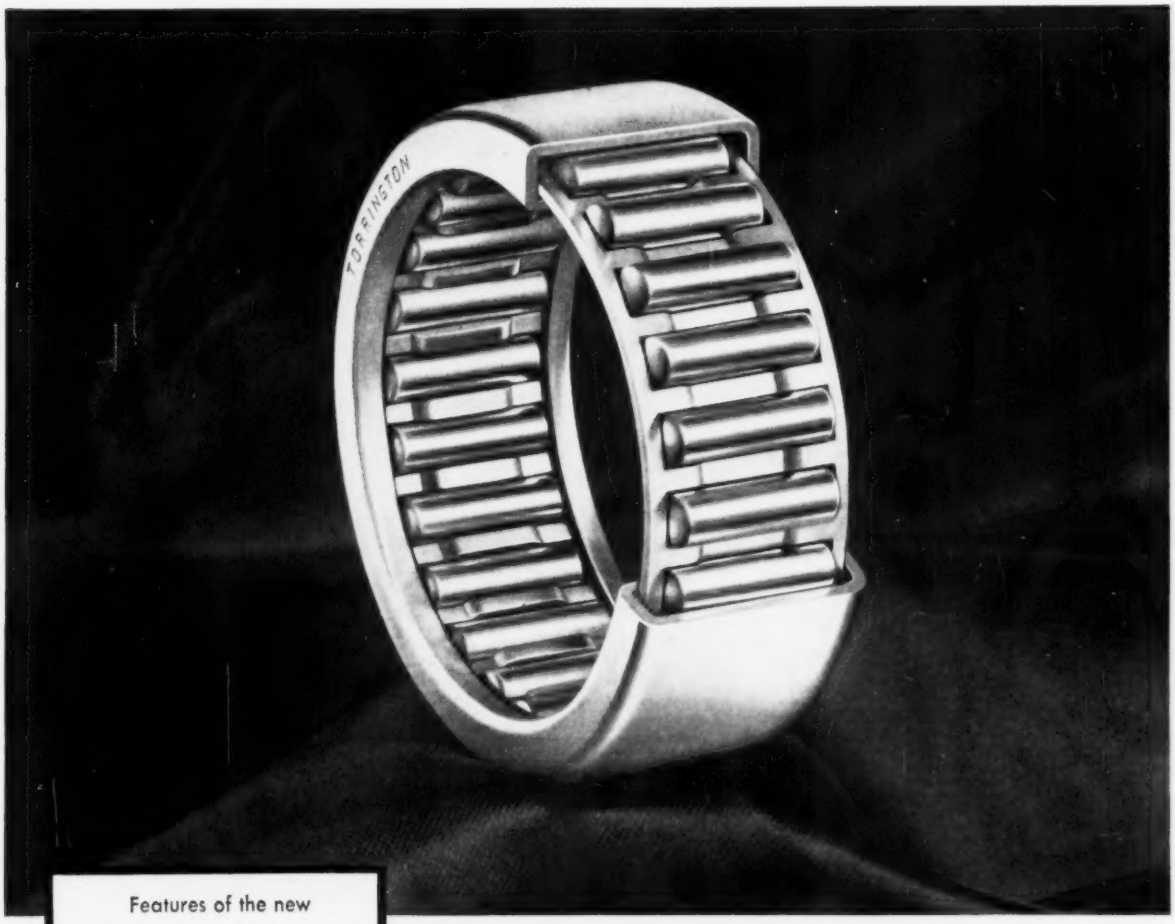
A 12-page metalworking guide contains information on carbide rotary tools. Highlighted are end mills made by an electrolytic process. (Elgin National Watch Co.)

For free copy circle No. 39 on postcard

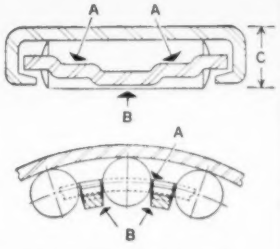
Freight Handling

Plant switching, spotting and hauling operations performed by a convertible steel to rubber-tire wheeled vehicle is shown in a performance report. It converts quickly for rail or road travel. (Whiting Corp.)

For free copy circle No. 40 on postcard



Features of the new
TORRINGTON DRAWN CUP ROLLER BEARING



- rollers end-guided at pitch line (A)
- shaft-riding retainer (B) designed to permit lubricant circulation
- high capacity in small cross section (C)
- long pregreased life
- efficient at high speeds
- mounted by press fit
- simple housing design
- low unit cost

INTRODUCING

a new low-cost precision roller bearing...

THE TORRINGTON DRAWN CUP ROLLER BEARING

For the first time, the advantages of drawn cup outer race construction are available in a precision roller bearing.

This compact, lightweight bearing consists of spherical end needle rollers, a one-piece hardened steel retainer and case-hardened thin-section outer race. Designed to run on a hardened shaft or with an inner race, this new series takes a press fit in a simple housing without snap-rings or shoulders.

Highly efficient roller guidance and lubrication are outstanding features. The shaft-riding retainer contacts the roller ends at the pitch line where guidance can be obtained with the least effort. The design provides ample storage for lubricant and promotes its circulation.

These features make the new bearing particularly suited to applications requiring compactness with precision, high-speed endurance or long pregreased life.

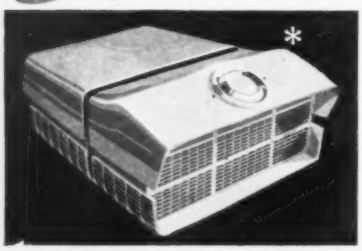
For information on sizes now available and for application assistance, call on our Engineering Department or write for the new bulletin, "Torrington Drawn Cup Roller Bearings." THE TORRINGTON COMPANY, Torrington, Conn. — and South Bend, Ind.

TORRINGTON BEARINGS

District Offices and Distributors in Principal Cities of United States and Canada

NEEDLE • SPHERICAL ROLLER • TAPERED ROLLER • CYLINDRICAL ROLLER • THRUST • BALL • NEEDLE ROLLERS

Idea!

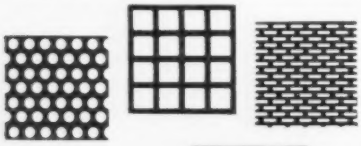


room air conditioning unit using H & K perforated metals

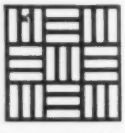
In the ¾ ton window air conditioner illustrated, perforated metals have been combined successfully with injection moulded plastics. The utilization, here, of new louvered perforated metals in adjustable frames on the frounced surface in combination with new embossed patterns on sides and under surfaces, afford rich tactile qualities hitherto unattainable in the air conditioner field.

Harrington & King perforated metals provide the Industrial Designer and other men of ideas unlimited opportunities to offer both functional and aesthetic properties as demanded in products for today's market. Contact H & K for your perforating requirements.

*Product Development by William M. Schmidt Associates



A few of the thousands of H & K perforated patterns. Illustrations are reduced in size.



Fill in and mail coupon to nearest H & K office.

THE Harrington & King PERFORATING CO. INC.

Chicago Office and Warehouse
5619 Fillmore Street
Chicago 44, Ill.

New York Office and Warehouse
118 Liberty Street
New York 6, N.Y.

Please send me—

☐ GENERAL CATALOG NO. 62
☐ STOCK LIST of Perforated Steel Sheets

NAME _____
TITLE _____
COMPANY _____
STREET _____
CITY _____ ZONE ____ STATE _____

You Arbitrate It!

THE "RED CIRCLE" GRINDER

From the files of the American Arbitration Association

After several years of haphazard hiring and wage rate setting, management of an office equipment manufacturing plant and the union decided upon a joint job evaluation plan. They set up new job descriptions, grouped jobs into labor grades, and adjusted rates to eliminate inequities. Employees who found themselves on jobs that were upgraded were to be given increases to the new levels. On the other hand, it was agreed that no worker "would be affected by downgrading."

Sam G., a grinder, turned out to be one of the men holding a "red circle" rate. He was getting $73 a week on a job which should pay $63, according to the job evaluation plan. Two months later, however, a vacancy occurred in the machine shop that happened to be rated at $73. Management promptly ordered Sam transferred to that job.

The union protested. "Vacancies were supposed to be filled by promotion on the basis of seniority," the business agent argued. He cited the collective bargaining agreement, which read: "A vacancy in any position, or a newly created position, shall be filled by promotion of a qualified employee on the departmental seniority list."

The union representative went on to insist that to fill a vacancy by transferring Sam was a violation of the supplementary agreement on the job evaluation plan in that it reduced promotional opportunities in the plant, thereby adversely affecting the employees in general. "The job evaluation plan was not supposed to work to the disadvantage of the employees in any way," the business agent concluded.

When the matter came to arbitration, the company answered that the right to transfer Sam was inherent in the agreement on the job evaluation plan. "The object was to eliminate inequities without reducing the pay of any employee," the company attorney said. "Sam's pay would not be reduced by the transfer, but if we didn't move him to a job commensurate with his pay we would be only perpetuating inequities instead of correcting them." How would you rule?

NEW BOOKS

"Design of Grey Iron Castings" tries to foster closer co-operation in the technical field between the purchaser of iron castings and the ironfounder. It was originally a French work, now in an English translation. 55 pp. 104 drawings. $2.00 per copy. The Council of Ironfoundry Assns., 14 Pall Mall, London SW 1, England.

"Industrial Ovens and Dryers" 40 pp. $1.00 per copy. Factory Mutual Engineering Div., Associated Factory Mutual Fire Insurance Cos., 1151 Boston - Providence Turnpike Norwood, Mass.

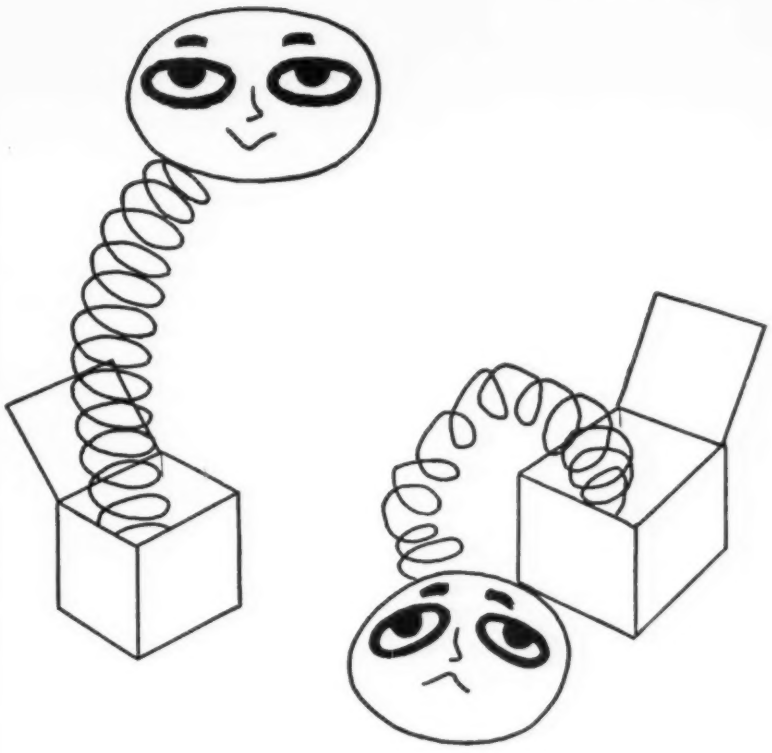
Commercial Arbitration

"Ask Any Fair-Minded Man," a new 16-page booklet, describes the growing use of arbitration in settling business disputes. Just published by American Arbitration Assn., it shows typical cases solved, explains that a national panel of 13,000 arbitrators is available, usually without fee. For a complimentary copy, address the association at 477 Madison Ave., New York 22.

The Arbitrator Ruled:

He held that since the written agreements were clear on the point, he had to uphold the union's arguments. At the time of the job evaluation plan the right of employees to fill vacancies by promotion was clearly established. There was nothing to indicate that the union had bargained that right away. The arbitrator said that to the extent there was "reasonableness" in the company's argument in favor of elimination of inequities and of "equal pay for equal work," it was a matter for negotiation between the parties. He reminded them that he could neither add to nor modify the contract as written.

Caution: The award in this case is not an indication of how other arbitrators might rule in other apparently similar cases. Arbitrators do not follow precedents. Each case is decided on the basis of the particular history, contract, testimony and other facts involved.



Some Springs Have It...Some Don't

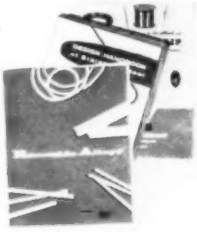
The difference in spring performance is most often due to the wire or strip used... and there's more to a spring material than just the "bounce". How about other requirements, such as corrosion resistance, high temperature properties, fatigue resistance and low temperature toughness.

When your springs need any of these properties your best bet is one of our alloy spring materials.

Riverside-Alloy Metal Division can supply you with spring wire and strip in stainless steels, nickel alloys, phosphor bronze and beryllium copper.

Learn more about our spring materials. Write to Riverside-Alloy Metal Division, H. K. Porter Company, Inc., Riverside, N. J.

Send today for our free handbooks

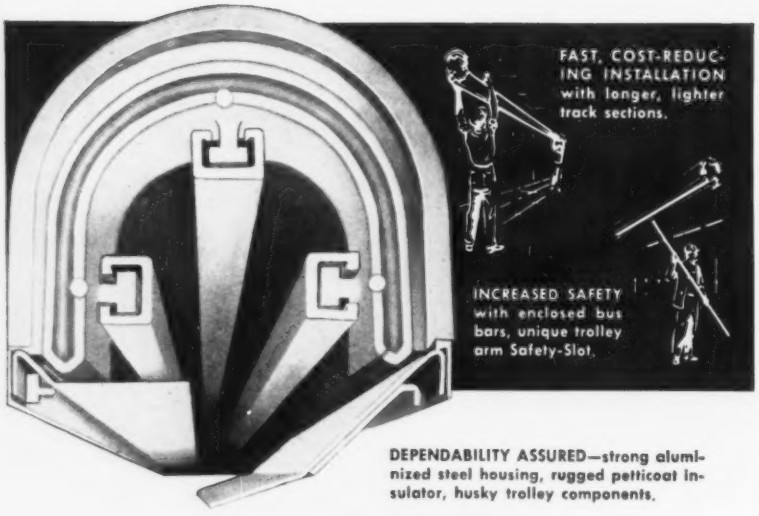


ALLOY METAL WIRE
Prospect Park, Pa.

RIVERSIDE METAL
Riverside, N.J.

PRENTISS WIRE MILLS
Holyoke, Mass.

HKP RIVERSIDE-ALLOY METAL DIVISION
H. K. PORTER COMPANY, INC.


FAST, COST-REDUCING INSTALLATION with longer, lighter track sections.
INCREASED SAFETY with enclosed bus bars, unique trolley arm Safety-Slot.

DEPENDABILITY ASSURED—strong aluminized steel housing, rugged petticoat insulator, husky trolley components.

New LEC-TROL-FEED System

for fast-action installation . . . safety-first power

This new, preassembled LEC-TROL-FEED conductor system gives you outstanding advantages for supplying electric power to cranes, hoists, welding units and other straight-runway equipment.

LEC-TROL-FEED Systems are installed faster and at lower cost than ever before. All units are preassembled in standard 30 ft. rigid-track sections. That means fewer joints, fewer hangers. Expansion sections are needed only at building joints. No extra rain shields needed for outdoor applications.

You gain maximum safety with LEC-TROL-FEED Systems because current carrying bus bars are almost completely enclosed – minimizing danger from contact with current-carrying bus. Trolley Safety-Slot covers are removable—parts easily accessible.

Additional features include compactness for close vertical stacking, maximum ruggedness, maximum leakage distances, proved aluminum bus bars. Track power capacity 300 amperes, AC or DC; trolley ratings up to 300 amperes.

For complete information, write or ask for LEC-TROL-FEED Bulletin.
Electric Service Works,
Delta-Star Electric Division,
H. K. Porter Company, Inc.,
Philadelphia 32, Pa.

HKP ELECTRIC SERVICE WORKS
DELTA-STAR ELECTRIC DIVISION
H. K. PORTER COMPANY, INC.

TECHNICAL BRIEFS

Gamma Rays Control Cold-hearth Unit

When preparing metal in an electric arc furnace, it's important to watch and control the charge level.

Gamma rays now do this.

▪ Gamma rays control a new cold-hearth arc furnace for preparing purified titanium. The rays, emitted from radioactive cobalt, detect and control the level of molten metal.

In use on a furnace at Westinghouse Electric Co.'s Blairsville, Pa., plant, the setup's rays pass through as much as 15 in. of solid metal. The furnace's successful operation demands exact control of the molten surface of the titanium ingot inside it. Such control must be foolproof, precise and fastworking. Yet it has to be done under extremely difficult conditions. For example,

Gamma rays emit from bomb (left) and pass through furnace.

Want More Data?

You may secure additional information on any item briefed in this section by using the reply card on page 129. Just indicate the page on which it appears. Be sure to note exactly the information wanted.

the temperature of the liquid titanium is more than 3000°F.

Penetrating Rays—By beaming gamma rays through the furnace walls and the 12-in. titanium ingot inside it, observers "see" the actual level of the titanium. They use this information in automatically raising or lowering the ingot to its correct operating level. This insures proper furnace operation.

"This control by gamma rays," Westinghouse believes, "brings a new degree of reliability and safety to titanium arc furnace operation. It is a critical job of measurement and control which would be very difficult to handle by any other means."

Builds Own Unit—Study of the technique and development of the control were done by Westinghouse scientists P. R. Malmberg, Alexander Mester and Dr. K. H. Sun. To design the gamma ray control, they built a duplicate of the actual cross section of the titanium furnace. This included a replica of the titanium ingot inside the furnace. This ingot has a curved top surface hollowed out something like a bowl.

The source of gamma rays, a small needle of cobalt-60, is placed outside the furnace and in line with the top surface of the ingot. The "hot" cobalt-60 is kept inside a shielded lead box having walls about 4-in. thick. When a door in the box is opened, a beam of gamma rays passes through the furnace walls and across the top surface of the ingot.

Too High; Too Low—If the inside of the furnace is too high, it partly blocks the beam of gamma rays. This reduces the amount of radiation getting through the furnace. If it's too low, the beam is interrupted less by the ingot; the radiation through the furnace is then greater. These changes in the amount of gamma radiation are used to detect the ingot's position and bring it to its correct level.

Gamma rays passing through the

Proof of Vulcan Tool Steel Superiority:

Tooling Downtime Reduced PRODUCTION UP 15%!

Vulcan TM-6, "M-2 type" high-speed tool steel, has increased tap life by 15% at Detroit Brass & Malleable Company, Wyandotte, Michigan.

Eight years of closely-controlled "stand up" tests of milling cutters and thread hobs preceded the selection of TM-6 for exclusive use in threading and tapping machine operations. *The payoff:* Production records, for the past seven years, offer positive proof of 15% better performance by using Vulcan TM-6.

Comparable on-the-job performance information is available for many of Vulcan's other steel grades. For the name of your nearest Vulcan representative write, wire or call collect. Vulcan Crucible Steel Division, H. K. Porter Company, Inc., Aliquippa, Pa.

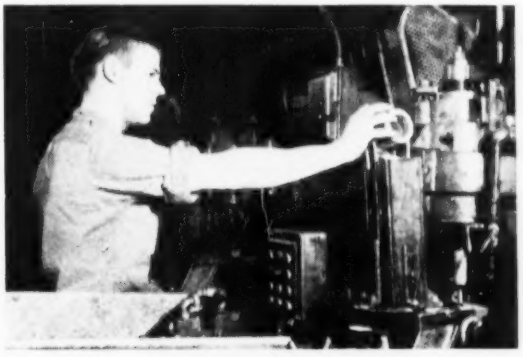
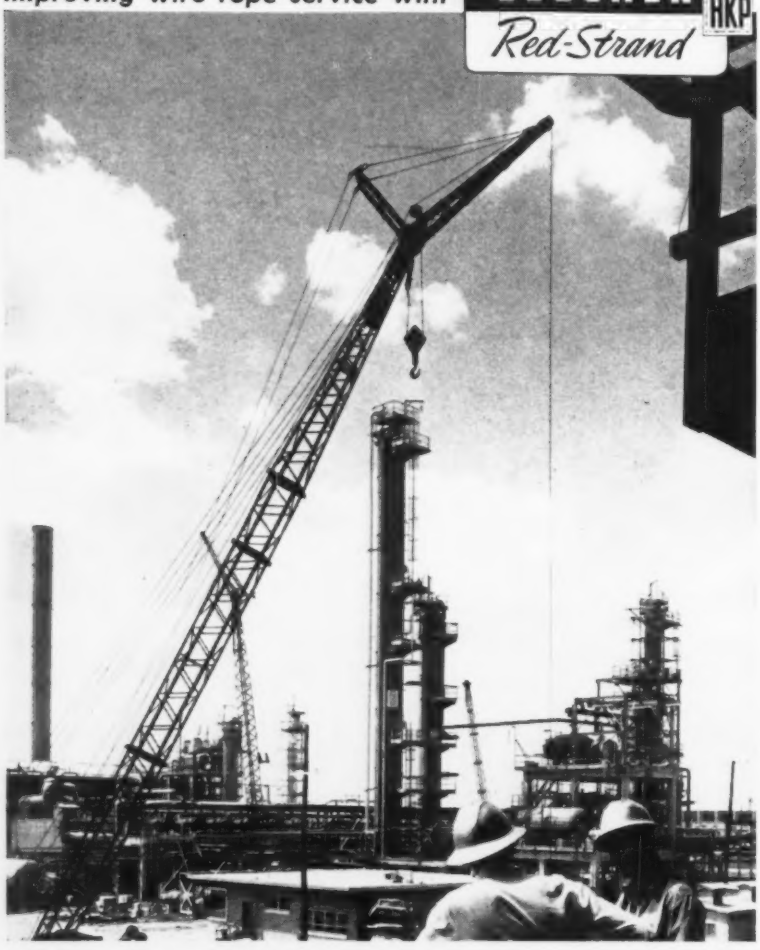


Photo at top shows General Foreman Robert Welch giving "specification plus" okay to DBM fittings as Vulcan representative examines tap used in manufacture.

Photo at left shows typical tapping machine operation at Detroit Brass & Malleable Company's nine-acre site.

HKP VULCAN CRUCIBLE STEEL DIVISION
H. K. PORTER COMPANY, INC.

Improving wire rope service with **LESCHEN** HKP *Red-Strand*



This one test proves which wire rope serves you best

"Problem jobs" may frequently make you wonder about the rope you're using.

Are you faced with unusual operating conditions? Is the rope the right type – size – grade – construction? Is greater tensile strength needed? Are you using the right brand?

The test is to use Leschen's on-the-job Service-Score Sticker reports. Keep the score—know the results—and questions are answered.

Then check with your Leschen man for engineering help. And, be sure to use Leschen's highest quality, service-proved Red-Strand wire rope. *Leschen Wire Rope Division, H. K. Porter Company, Inc., St. Louis 12, Mo.*

Write for Service-Score Fact-Folder

HKP LESCHEN WIRE ROPE DIVISION
H. K. PORTER COMPANY, INC.

furnace are detected by two scintillation counters. These contain a crystal which change the rays into flashes of light. The counter converts the light flashes into electrical pulses and amplifies them. The amplified pulses feed to electronic circuits; these then drive a hydraulic system that raises or lowers the titanium ingot to the exact position required for proper operation of the arc furnace.

Accurate, Too—The system can detect and maintain the level of the titanium ingot to within one-hundredth of an inch of its ideal operating position. If, for any reason, the ingot moves beyond its prescribed limits, the gamma ray control causes immediate shutdown of the furnace.

Although designed expressly for the titanium furnace, company spokesmen say similar units could control other types of furnaces. They could also operate with other position - measuring and leveling applications.

Cutters Face Piece Without Burrs

Cemented carbide cutting tools with razor sharp edges completely eliminate burrs in a facing operation. The application involves flute tone hole seats of 18 to 20-pct nickel silver.

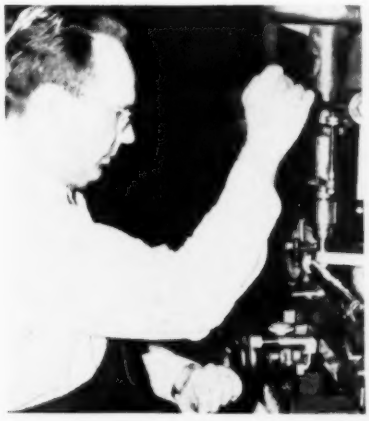
Employed by H. & A. Selmer, Inc., Elkhart, Ind., band instrument maker, the carbide cutters have high resistance to cutting wear. Only a hone is needed to resharpen the tools the first three times.

Trims Stubby Tube—Facing the tone holes of flutes, produced from the hard-drawn nickel-silver tubing, consists of trimming down "stubby" tubing projecting from the flute barrel to a standard height.

Top diameters of the tone holes call for a fine finish. It's important during the face cutting operation to eliminate burring. This would

destroy tone hole flatness. At one time, chatter marks, burring and machine down-time were constant problems for the firm. Previous cutting tools were erratic in performance. They also required resharpening every three or four hours. Application of Carboloy grade 350 cemented carbide on the job, however, changed the situation.

Wiped Out Worries—Today, the company reports, cemented carbide tools have wiped out all of these



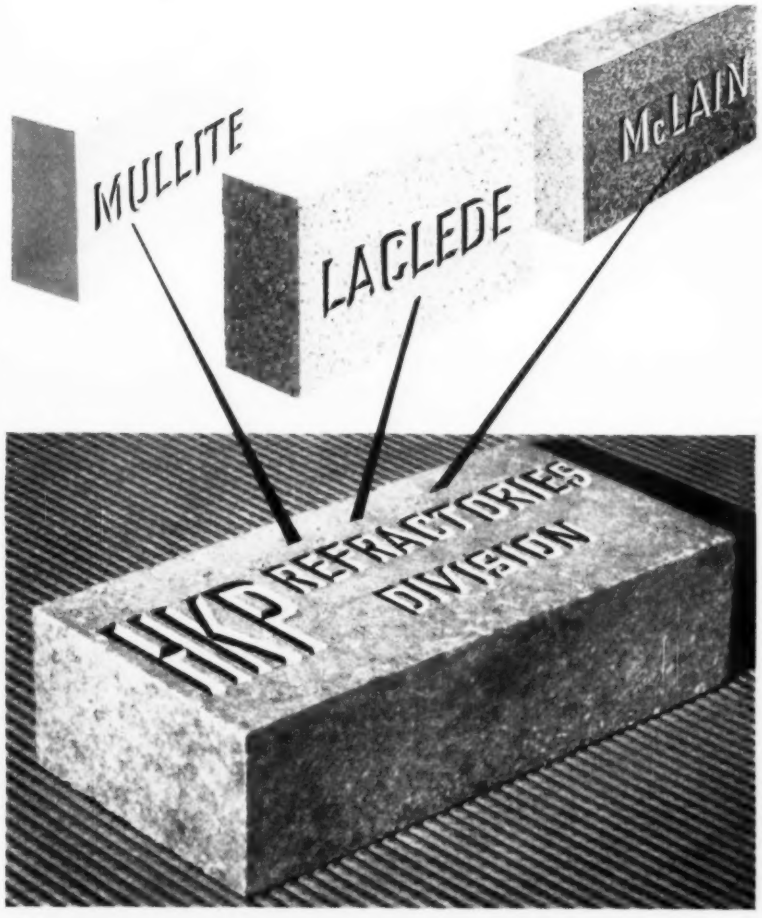
Here, a drill press operator performs the facing operation.

problems. Workers now sharpen tools twice a month. They use a silicon carbide wheel only after the third hone sharpening procedure.

To make the face cuts, the company uses a modified drill press. Since the operation involves a fast, light cut, the machine has a strain indicator. This keeps the operator posted on cut pressures; it also is a guide to keep the cutting tool from wobbling, or creating a double cut.

The Tool Rake—To obtain accuracy of ±0.001-in., the carbide tool has a 20° rake angle and a 5° clearance angle. The cutter is made from a standard blank, brazed to a pin type shank. Its final razor-like cutting edge is provided with a diamond hone.

During the operation, facing is worked at a cutter speed of 3500 rpm. Each tone hole is faced in about a fifth of a second.



HKP now gives you this newly expanded source of refractories

Now the combined operation of Laclede-Christy, McLain Fire Brick and Mullite Works is under H. K. Porter Company, Inc. leadership. This integrated organization gives you an expanded refractory product line from *one source*. It means increased benefits for you through greater research, manufacture and distribution facilities. It means still better service to you.

When you need refractories of any type, check HKP Refractories Division—the *growing* producers in the industry.

LACLEDE-CHRISTY WORKS · **McLAIN FIRE BRICK WORKS** · **MULLITE WORKS**
St. Louis, Missouri — Pittsburgh, Pennsylvania — Shelton, Connecticut

HKP REFRACTORIES DIVISION
H. K. PORTER COMPANY, INC.

Firm Rapidly Finishes Many Small Parts

Finishing troubles used to harass one company in its production operations. These involve painting of 1000 different parts for power sweepers, floor machines, scarifiers, roof scrapers and concrete routers.

Thanks to a new finishing system, specially engineered for G. H. Tennant Co., Minneapolis, these worries exist no more. The new setup speeds washing and drying of all parts (weighing from ounces to 800 lb each). It also speeds spraying and baking both the prime coat and a bright orange or cream finish coat.

Saves Time — The continuous-conveyor system lets the firm do in 24 man-hours what used to take 80 man-hours. It results in a very good finish, too, reports its users.

The setup includes a three-stage washer, dry-off oven, two-man spray booth and a 74-ft baking oven. Its builder and installer is Despatch Oven Co., Minneapolis.

How It Works — Metal parts, from basket loads of small units to large frames measuring up to 4½ x 5 x 6 ft, first enter the 44-ft washer. Here an acid pressure spray of "Oakite Cryscoat 89" converts the surface to an iron-phosphate coating. A cold water rinse follows. Then a hot rinse hardens the rust-resistant and corrosion- resistant phosphate salts.

Sprayers finish large frames as they move along conveyor.

Parts pass immediately into a 34-ft dry-off oven. This stays at 350 to 400°F, depending upon the size of the parts.

To Spray Booth — Parts then move to the down draft filter spray booth. Here two men apply the prime coat or either of the orange or cream finish coats.

Speed of the 500-ft conveyor is approximately 8 fpm. This gives the sprayers sufficient time to finish any of the 1000 different parts.

Flows Smoothly

Scars of past pounding are still visible on a chute where two unique vibrators have put an end to the old inefficient method. At Cluett Peabody Co., Waterford, N. Y., the

Save! WITH SALT BATH CARBURIZING (or case hardening)

. . . a fast, economical method for producing a specified case depth

If you're looking for a fast, economical, uniform carburizing method, Ajax Electric Salt Bath Furnaces are the logical answer.

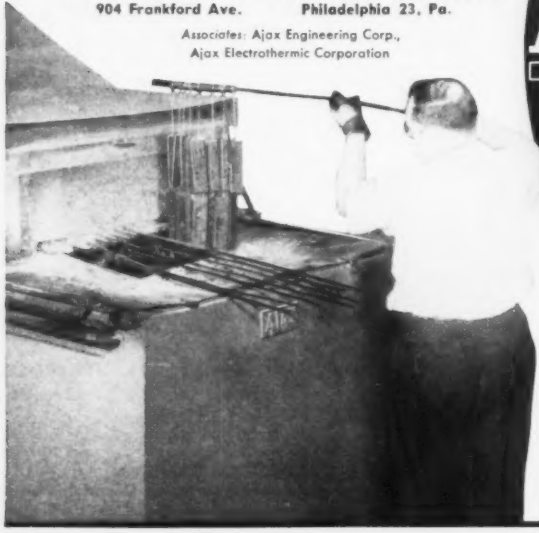
Equipment costs are materially lower than those of any other production carburizing system. Exceptionally long pot life minimizes maintenance. Most important, you get fast heating, close control of case depths, and a minimum of distortion. There is no spalling or pitting. Work is quenched directly from the carburizing bath . . . no reheating is necessary. Selective hardening is easy. Where needed, carburizing and brazing may be done at the same time . . . carburizing can be combined with martempering in one heating . . . or several batches may be hardened to different case depths simultaneously.

Heat treating flexibility like this cuts costs!

WRITE for Carburizing Case History Bulletins. Let the Ajax Metallurgical Service Labs demonstrate carburizing of your parts under shop conditions. No obligation.

AJAX ELECTRIC COMPANY
904 Frankford Ave. Philadelphia 23, Pa.
Associates: Ajax Engineering Corp., Ajax Electrothermic Corporation

AJAX HULTGREN electric SALT BATH furnaces



TYPICAL!
This Ajax furnace is used for case hardening over 100 different kinds of sewing machine parts. Reduced maintenance alone in only 4 years spelled savings that more than paid for this unit.

NOTHING *can equal Stainless Steel*

in its unique combination of properties

No other design material can match Stainless Steel in its combination of desirable properties: corrosion resistance, strength, hardness, beauty, cleanability and easy fabrication. For a reliable source of supply, United States Steel offers you the widest range of types, finishes and sizes.

UNITED STATES STEEL CORPORATION, PITTSBURGH • AMERICAN STEEL & WIRE DIVISION, CLEVELAND
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UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS STAINLESS STEEL

SHEETS · STRIP · PLATES · BARS · BILLETS
PIPE · TUBES · WIRE · SPECIAL SECTIONS

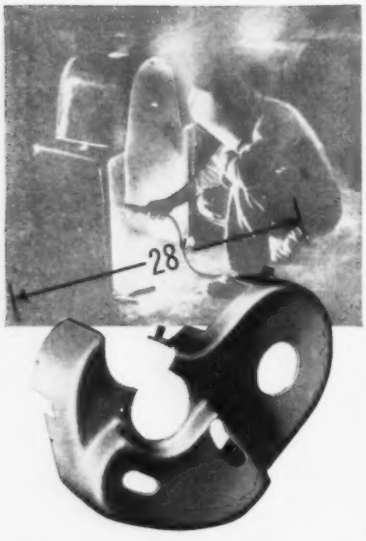
USS

UNITED STATES STEEL

FOR HIGH TEMPERATURE STRENGTH. The Ryan Firebee is a pilotless jet airplane that flys about 600 mph at altitudes up to 40,000 feet. All three armed services are using it for target practice—to simulate attacking aircraft. Fuselage and turbojet engines use substantial quantities of Stainless Steel—mostly because of its excellent strength/density ratio at elevated temperatures.

FOR CORROSION RESISTANCE. If you're a photographer, you know that hypo is awfully corrosive. This print washer (it holds 75 8x10 prints in one loading) is made completely from Stainless Steel by the Arkay Corporation, in Milwaukee. For proof that Stainless is easy to fabricate, notice that the drum has 1,700 perforations, and double lockseam soldered joints are used throughout.

FOR TAKING A BEATING. These supermarket check-out counters are made from USS Stainless Steel. They withstand the pounding of heavy containers and are unaffected by corrosive meat and produce juices. It only takes 20 minutes for one girl to clean all eleven counters shown here. The Robert Becht Company of Cincinnati made them.



not a stamping, but

BUILT UP

from

SHEET METAL

This machine guard is a typical example of the intricate, precision sheet metal parts we custom fabricate to individual and often exacting specifications. Even though it may look like a complex stamping, it was actually individually formed and built up from sheet stock. We are equipped to make almost any sheet metal item, in any quantity; we can stamp, shear, break, roll, weld, machine, assemble and finish all types of metal—aluminum, brass, copper, monel, stainless and all other steels. We have the facilities and the personnel to produce consistently top quality work, at competitive prices.

if you use sheet metal component parts, write

the

CINCINNATI VENTILATING

Company

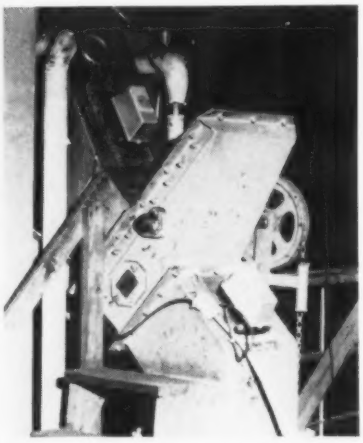
304 Madison Ave.

Covington, Ky.

TECHNICAL BRIEFS

recently installed duo set in the chute above and below the weighing gate.

At about 10-minute intervals, when the firm's boilers call for fresh fuel, the units transmit vigorous vibrating impulses for 30-seconds. This starts the crushed coal instantly on its way. It prevents sticking, arching or bridging.



Two vibrators in this chute halt sticking, arching or bridging.

Secret of the unit is a team of an electro-magnet with an Alinco V permanent magnet. These operate to set up a kneading action in the chute's walls. This setup is compact, easily installed. It needs no rectifier, operating directly from available alternating current. Its maker is Eriez Mfg. Co., Erie, Pa.

Alloy Is 99-pct Native

Jet engine bearings to operate at elevated temperatures are now made of a "99-pct native" alloy steel. Federal-Mogul-Bower Bearings, Inc., Detroit, developed the new alloy to assure the supply of bearings in time of national emergency.

The new steel is tabbed Bower 315. It's produced by Republic Steel Corp. Principal alloying elements of it are: 3-pct nickel, 1.5-pct chromium and 5-pct molybdenum. The material uses no tungsten or cobalt. The nickel, though considered an important strategic material in any emergency, is essentially of Canadian origin. Substantial additional supplies are also being developed in Cuba.

Tired of Pulling Welder Around?

Tired of pulling heavy welding equipment around the plant for on-the-spot repair jobs? Maintenance crews of Clark Equipment Co., Battle Creek, Mich., felt the same way. So they converted a battery-operated hand truck into a self-powered mobile welding unit.

To the forks of a pallet-type truck the servicemen have bolted a 450-amp welding machine: the control panel is welded to the top of the motor case. On the front end of the unit, scrap angle irons

Push a button for higher production with

READING ELECTRIC HOISTS

● Ohio Crankshaft's Tocco Division plant is meeting higher production goals with help from Reading Electric Hoists. The new plant was designed with a Reading Hoist "custom-built" into the plans. Write for our latest bulletin "The Why and How of Faster Production".

READING CRANE & HOIST CORP.

CHAIN HOISTS • OVERHEAD TRAVELING CRANES • ELECTRIC HOISTS

2101 ADAMS ST., READING, PA.

and a thin steel sheet are fabricated into a table.

Five round steel containers, welded to the table, hold welding rods. At the rear, scrap angle irons form a frame. On this, the men hang hose, clamps and other equipment. The unit carries 50 ft of cable for power supply and 20 ft of welding cable.

Rubber is Transparent Resists High Heat

A new silicone rubber has glass-like transparency. Yet it resists high temperatures.

The rubber, a product of Dow Corning Corp., Midland, Mich., shows promise as a center layer in safety glass windshields on supersonic aircraft. However, it could have other similar high-temperature applications. Whereas some safety glass interlayers soften, bubble and lose shear strength at extremely high temperatures, the new material doesn't.

This rubber material is clear enough for jet plane use.

It retains full strength and clarity at temperatures ranging from —65 to over 350°F.

Nils Pipe Leaks

Manufacture of polyethylene demands a completely leak-proof, non-corrosive process piping system. Koppers Co. knew that Schedule 40 stainless steel pipe with conventional threaded fittings

WHAT'S THE FASTEST WAY TO CLEAN METAL?
See page 11
WHAT'S THE MOST ECONOMICAL WAY?
See page 9
Some good things to know about Metal Cleaning
OAKITE PRODUCTS, INC.

Oakite's FREE Booklet on Metal Cleaning

answers many questions that mean better production, more profit for you. Just look at the table of contents:

- Tank cleaning methods
- Electrocleaning steel
- Electrocleaning nonferrous metals
- Pickling, deoxidizing, bright dipping
- Applying iron phosphate coatings in preparation for painting
- Applying zinc phosphate coatings
- Cleaning, removing rust and conditioning for painting in one operation
- Machine cleaning methods
- Paint stripping
- Steam-detergent cleaning
- Barrel finishing, burnishing
- Better cleaning in hard water areas
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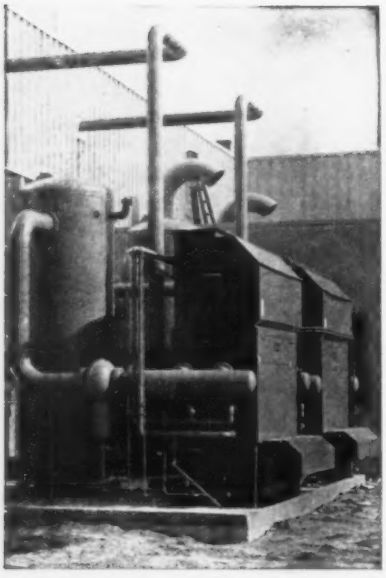


This Niagara Aero After Cooler also cools compressor jacket and intercooler water.

COMPRESSED AIR
• Lower in Cost
• Drier and Cooler

THE NIAGARA *AERO* AFTER COOLER offers a completely self-contained method replacing both shell-and-tube cooler and cooling tower. It is independent of a large supply of cooling water and consistently reduces compressed air temperatures to below ambient.

Drier air gives you better operation and lower costs in using all air-operated automatic instruments, tools and machines, paint spraying, sand blasting and moisture-free air cleaning.

Direct saving in the cost of cooling water saves the price of the Niagara *Aero* After Cooler in less than two years.

Niagara *Aero* After Cooler assures all these benefits because it cools compressed air or gas below the temperature of surrounding atmosphere; there can be no further condensation in your air lines. It condenses the moisture by passing the air through a coil on the surface of which water is evaporated, transferring the heat to the atmosphere. It is installed outdoors, protected from freezing in winter, proven in service on the largest plant utility systems.

Write for Bulletin No. 130

NIAGARA BLOWER COMPANY
Dept. IA-51, 405 Lexington Ave.
NEW YORK 17, N. Y.
District Engineers in
Principal Cities of U. S. and Canada

could solve corrosion problems, but wanted to avoid costly leakage at joints in a new installation. So the firm chose Speedline fittings. Tests indicated that these would give adequate protection against leakage even when using light-wall pipe.

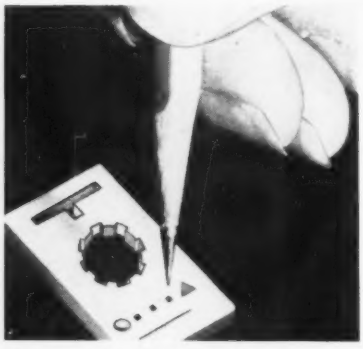
Not only did the company avoid leakage, but it cut installation time by 70 pct. In addition, material costs were considerably less than they would have been for pipe wall heavy enough to allow for loss of wall thickness at the threads. The fittings are made by Horace T. Potts Co. of Philadelphia.

Drills by Ultrasonics

Recently started operation is a firm which does ultrasonic drilling and grinding of brittle and hard to machine materials.

Operator of the setup is Zenith Optical Laboratory, Copiague, L. I., N. Y. They make round and irregular shaped cavities to precision tolerances in materials including ceramics, carbide, germanium, etc.

Liquid Suspension — The ultrasonic method they use employs abrasives in liquid suspension. An ultrasonic transducer actuates the



The setup drills holes in very hard materials.

abrasive particles at the rate of 25,000 cycles per second. An important feature of the process is that the internal grain structure of the worked material remains unchanged, since no heat is generated.

The tool face actually never contacts the work. Ultrasonic vibrations instead direct the suspended abrasives against the workpiece.

Electrons Help Make Better Materials

Electrons are rapidly becoming well-used tools of researchers. Thanks to an electron diffraction instrument, they help solve many materials failure problems.

Developed by General Electric Co., the unit "bounces" a stream

Operator adjusts focus control on the diffraction unit.

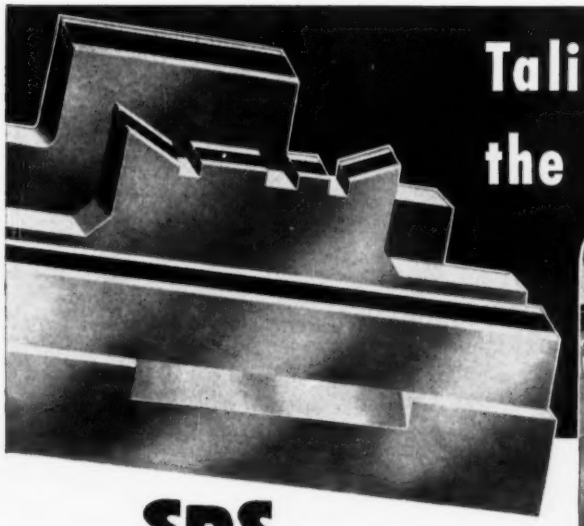
of electrons off the surface of various materials and produces a characteristic pattern. This pattern then guides further research for better manufacturing processes and materials.

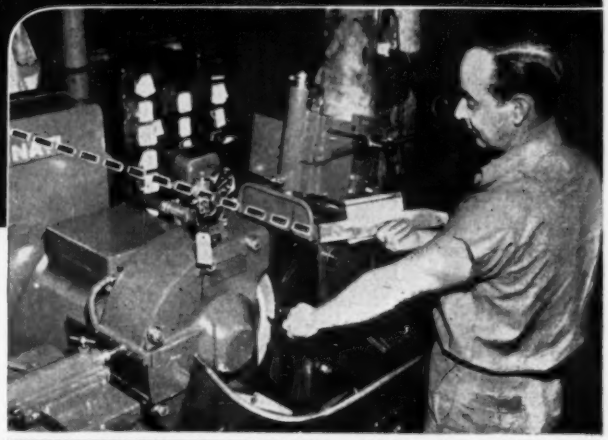
Aids Metallurgy — The electron diffraction unit is also expected to prove useful in such fields as lubricating films, metal-plating, powder metallurgy and scale formation.

Electron diffraction is similar to x-ray diffraction. The basic difference is electrons penetrate much less than x-rays. As a result, the chemical composition and crystal structure of a substance's surface can be determined. On the other hand, a beam of x-rays from a sample provides information relative to the average of the entire sample.

Probes Thin Items — Electrons

Talide-Tipped Blades on the job for over 10 Years!





SPS

STANDARD PRESSED STEEL CO.

JENKINTOWN, PENNSYLVANIA

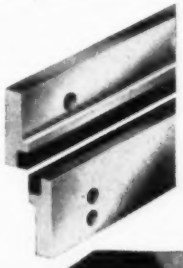
world's largest producer of socket screws, has been a regular user of Talide-tipped centerless grinder blades for the past 10 years. SPS centerless grinders are equipped with super-hard Talide centerless blades, enabling millions of precision parts to be centerless ground without downtime for blade changing, regrinds or replacements. The Talide carbide wear strip is produced by us in ONE SOLID SECTION UP TO 100" IN LENGTH WITHOUT SEAMS. A solid carbide wear strip has been proven more efficient than shorter sections brazed or butted together because the possibility of marking or scoring the work is eliminated.

TALIDE ROTARY KNIVES GIVE PHENOMENAL RUN OF 90-1...

A leading strip steel producer of razor blade, high-carbon, spring and stainless steel reports over 1200 coils were gang slitted with Talide knives compared to 15 coils with steel knives. More tonnage was produced in one regrind of the Talide knives than over the entire life of a set of steel knives. Burr-free, clean-cut edges produced with scrap rate practically eliminated.

$18,000 SAVED USING TALIDE SHEAR BLADES!

A large electric motor manufacturer shearing .014" silicon steel for transformers advises first year savings of $18,000 in blade costs after completely equipping their press line with Talide-tipped blades in lengths ranging from 15" to 87". Talide shear blades are averaging 1,000,000 cuts per grind compared to 10,000 cuts obtained with steel blades.



Over 50 sizes and styles of standard blades carried in stock—with special blades made promptly to order. Write for 76-page catalog 56-G or ask for sales engineer to call.

METAL CARBIDES CORPORATION
Youngstown 12, Ohio

EXCLUSIVE RETIPPING SERVICE

Because of its exclusive hot press method, Metal Carbides is able to rework worn, chipped out or broken areas of carbide-tipped blades back to original size and dimension with all breaks and defects eliminated.

METAL CARBIDES CORPORATION

TALIDE®

YOUNGSTOWN 12, OHIO

HOT PRESSED AND SINTERED CARBIDES • VACUUM METALS
HEAVY METAL • ALUMINUM OXIDE • HI-TEMP. ALLOYS
OVER 25 YEARS' EXPERIENCE IN TUNGSTEN CARBIDE METALLURGY

can detect samples as thin as 15 angstrom units, (4-millionths of an inch). This permits electron beam transmission through very thin surfaces. Diffraction patterns so produced usually require exposures of only one second to two minutes.

The specimen is positioned by means of a manipulator. An observer watches the resultant diffraction pattern on a fluorescent screen. He photographs it with a camera mechanism. Five exposures can be made at one loading of the camera.

Capable of chemically analyzing as minute as five micro-micro grams, the instrument should lend itself to many research and production applications. Here are a few mentioned by its developers:

Corrosion—The losses due to corrosion are tremendous; thus, the need to study its cause in the very early stages. The electron diffraction instrument will detect the first changes and help identify the chemical nature of these changes before they are visible with a microscope or detectable by other means.

Such analysis has helped in the selection of the best material for gas-turbine buckets.

Lubricants — Lubrication is a function of the surface film. What changes occur in oil films determines the efficiency of running machinery. Thus, the importance of the unit in determining good lubricating films and control processes for their production.

In addition, the instrument is useful for studying surface changes in bearings and cylinder walls, and for detecting and studying preferentially-deposited oil films.

Metallurgy—The interaction of thin films of metals can be studied and used as a control for the processes of making alloys. For example, a thin film of nickel was deposited on a sample holder and another film of iron deposited on top. The diffraction pattern was taken at room temperature and again at a higher temperature. The change in pattern showed alloying of the two metals.

In powder metallurgy, surface conditions of the powders determine whether they will alloy readily.

Unit Stretches Plate

Exerting a pulling force of 16-million lb, a giant machine literally stretches aluminum plate up to 6-in. thick, 90-ft long and 12-ft wide.

In operation at Reynolds Metals Co., McCook, Ill., the unit requires only one man for its operation. It stretches aluminum to release internal stresses set up in rolling and heat-treating processes. Weighing over 4,400,000 lb, the machine is 182½-ft long; 29-ft wide; 21-ft, 6-in. high from its base. Two-thirds of its mass is below the floor line. Special foundations incorporating unique resiliency features permit

ERIE Bolts • Studs • Cap Screws • Nuts
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Sharp eyes, made sharper by scientific instruments, verify microscopic details of thread accuracy at Erie Bolt & Nut Company. This is but one proof of the painstaking craftsmanship your own fastener specifications receive from the hands of Erie specialists. Fasteners to resist corrosion, extremes in temperature and tensile stresses to your specifications have been our exclusive job for almost half a century.
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the very high tensions exerted during operations. The two gripperheads which hold the aluminum plate during stretching weigh over one-half million pounds apiece.

Tractor Shovels Are Mill Wheelhorses

Tractor shovels, says an equipment firm, are the new wheelhorses at steel mills. They carry out a variety of jobs formerly re-

Here, a tractor shovel spreads asphalt outside a mill.

quiring a number of specialized machines and manual labor.

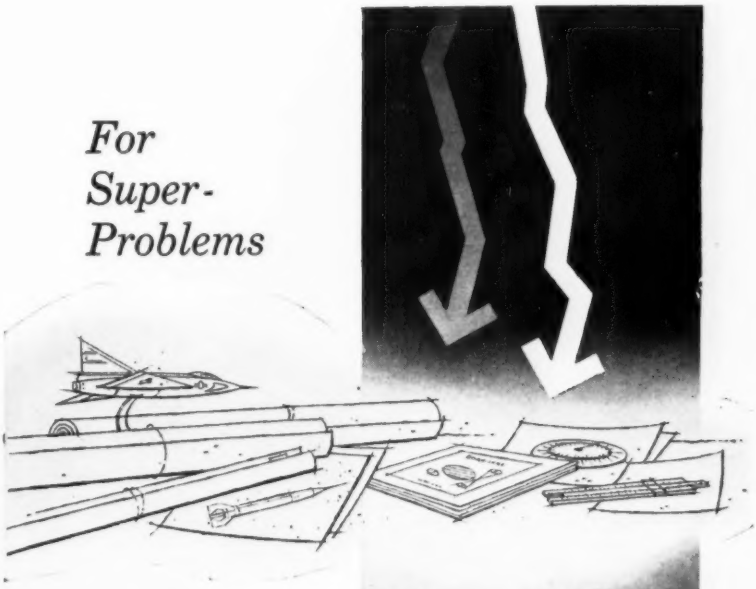
As one example, a tractor shovel at U. S. Steel Company's South Works replaces other equipment on an asphalt spreading roadwork job. It also loads trailers with sand, gravel, dirt or trash; then the same tractor hooks them up and tows them away.

Lists Stainless Facts

A new pocket-size slide chart contains information on how to machine popular grades of stainless. On one side it gives concise data on turning, drilling, tapping, threading, milling and reaming operations. It tabulates speeds and feeds, and gives special notes on drilling, tapping, lubrication and welding.

The other side shows relative workability of stainless steels in many operations including blanking, deep drawing, stamping, forg-

For Super-Problems



SUPER METALS by

WALLINGFORD

Whether the need is for vital aircraft parts that must withstand the searing heat of today's planes or those still on the drawing board . . . or for equipment used in handling acids and other corrosives throughout industry, Wallingford Steel is meeting the challenge successfully.

Constantly searching for new metals, new methods, Wallingford has long engaged in research and experimentation with high-strength, corrosion-resistant, high-temperature alloys. Research, too, has played a large part in enabling Wallingford to produce the quality stainless steel strip and tubing necessary to meet the rigid requirements of today's applications.

Wallingford's progress aids your progress! Write for further information that can help you solve the problems of today . . . and tomorrow!

WALLINGFORD STEEL CO.

THE WALLINGFORD STEEL CO.
WALLINGFORD, CONN., U.S.A.
Progress in Metals for over 35 Years

COLD ROLLED STRIP: *Super Metals, Stainless, Alloy*
WELDED TUBES AND PIPE: *Super Metals, Stainless*

ing, heading, roll threading, welding, etc.

Carpenter Steel Co., Reading, Pa., is currently distributing the chart.

Refractory Treatment Cuts Dust Problem

A new process for treating silica brick overcomes the problem of dust concentration in the air. It involves dipping the brick in a solution of Orzan A, a chemical product from wood pulping. Once done, there's a complete absence of silica dust in the brick laying area with no adverse effect on brick life or refractoriness.

Arc Furnace Worry—The Timken Roller Bearing Co. was concerned with the problem created by dust which results from handling silica brick used in electric arc furnace construction. It tested several products to bind the loose silica particles to the brick surface to prevent dusting. Water solutions of dry binders proved effective in eliminating the dust arising from handling the brick. Of the dry binders tested, Orzan A was chosen.

Produced by Crown Zellerbach Corp., Camas, Wash., the material is inexpensive and readily available. It's water soluble with a pleasant odor, easily applied by immersion or spray and dries rapidly to form a resinous coating. Added advantages: the prodcut contains no alkali, leaves no harmful residue, and except for a minor 0.9-pct of its original weight, it burns out completely.

Fork lift dips bricks into a dust combating solution.

Here's How—The process is as follows: Brick in original stacks on pallets are dipped into a solution (1 pound per gallon water). Each pallet takes 45 seconds, in and out. The solution penetrates even the innermost brick and dries to a dust-proof resinous coating around all surfaces.

The dipping operation is quite simple. It requires only a small investment in the amount of equipment needed. Cost of treatment is less than a half cent per brick. By dipping at the mill, Timken saves the added cost of the brick manu-

Hot or Cold Strip Steel, Brass, Copper, Aluminum . . . Plastics, Foils, Coated Fabrics, Film, Rubber, Etc., Even When Moving At High Speed.

Simple method—the "Measuray" shoots X-Rays through the material—measures its absorption of the rays. Calibrated meter registers plus or minus per cent of deviation from pre-determined standard. Especially useful on hot mills where material can't be checked by contact gages. Also when material can be deformed by contact such as foil.

"Measuray" is accurate to 1% of thickness or less. Quickly pays for itself in reduced scrap.

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PERFORATED METALS

The few perforations illustrated are indicative of the wide variety of our line—we can *perforate almost any size perforation in any kind of metal or material required.* Send us your specifications.

Sixty-seven years of manufacturing perforated metals for every conceivable purpose assure satisfaction.

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Your Scotts Electric Mower is unconditionally guaranteed for 5 years. This guarantee is possible because of exceptional materials, engineering and workmanship.
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O.M. Scott & Sons selects Monarch Permanent Mold Castings

for more casting value per dollar

In the words of O. M. Scott & Sons, famous for lawns, "We have been dreaming for 20 years of producing the perfect lawn mower. We have spent the last five years designing the Silent Scott®." The result is a new concept in lawn mowers, underwritten by their five year unconditional warrantee. Look for it at your neighborhood garden or hardware store.

Monarch Aluminum Velvaglaze® permanent mold castings are used for the 6 major parts of the assembly. The main reasons are strength, durability, performance and appearance. Monarch's ability to provide a "one-source", non-competitive analysis of all practical production casting methods contributed to the effectiveness of Scott's design. This same practical approach in your next development program can help you to obtain better end-products at lower factual end-costs.

The 6 major castings are Velvaglazed®—a natural lustrous aluminum, mar-resisting finish.

SINCE 1913
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PIONEERS IN CASTING PROGRESS

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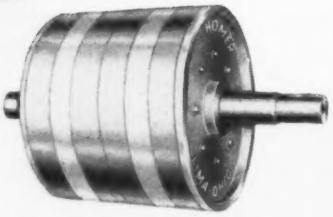
MONARCH ALUMINUM MFG. COMPANY—9205 DETROIT AVENUE—CLEVELAND 2, OHIO—OLympic 1-1700
MANUFACTURERS OF: *Aluminum Permanent Mold Castings • Zinc Die Castings • Aluminum Die Castings • Exclusive Velvaglaze Finishing • and Spectraglaze, colorful Porcelain Enamel on Aluminum Permanent Mold Castings.*

PERMANENT MAGNETIC EQUIPMENT FOR METALWORKING PLANTS

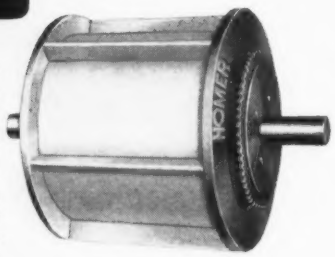
SAVE TIME . . . MONEY . . . LABOR

HOMER *HERCULES* AND *HERCULES*-SUPREME PERMANENT MAGNETIC PULLEYS



Homer Permanent Magnetic Pulleys in belt conveying systems cut costs in a multitude of metalworking operations. They automatically remove tramp iron from coke, slag, ores, foundry sand, etc. . . . sort ferrous from non-ferrous parts . . . and segregate ferrous from non-ferrous materials, minerals, etc. Trouble-free with no D.C. power supply required—no production stoppages as result of power failure. Homer's "Radial Pole Design" assures highest magnetic strength across entire working face of pulley for deep, effective penetration and positive control of magnetic materials. Write for Bulletin PY-260.

HOMER PERMANENT MAGNETIC DRUMS



Homer Magnetic Drums automatically and economically beneficiate ores . . . remove tramp iron from slag, coke, foundry sand, ores, etc. . . . and separate ferrous parts from abrasive material following tumbling barrel operations. For installation at discharge end of gravity, screw or belt conveying systems and for use with tumbling barrels. Permanent, non-electric and trouble-free—Homer Magnetic Drums require no outside power source. Homer's "Radial Pole Design," with permanence of magnetic strength guaranteed, assures maximum effectiveness at all times. Complete details in Bulletin MD-200. Write for it today.

OTHER HOMER PERMANENT MAGNETIC EQUIPMENT FOR INDUSTRY

HOMER MAGNETIC ROAD AND FLOOR SWEEPERS
Write for Bulletin MS-250

HOMER "SPACE SAVER" MAGNETIC CONVEYORS
Write for Bulletin MC-250

HOMER MAGNETIC SHEET SEPARATORS
Write for Bulletin SS-210

THE HOMER MANUFACTURING CO., INC.

DEPT. 137 **LIMA, OHIO**

THE FINEST IN PERMANENT MAGNETIC EQUIPMENT FOR INDUSTRY

facturer. It also avoids possible abrasion of the brick coating by rough handling during transit.

Got a Worthless Tank? Put a New One Inside

Tanks within tanks is a comparitively new fabricating innovation. It consists of converting worthless old tanks into usable systems.

Using this method, Haveg Industries, Inc., Wilmington, Del., employs tank-lining resin plastics. Asbestos filled phenolic or furan, graphite filled epoxy, and glass reinforced polyester make up the

Worker cements a new plastic tank inside an old metal one.

materials used. These resist nearly all commercially encountered chemicals including acids (even hydrofluoric), alkalis, and most organic liquids.

Saves Money—Lining tanks by field molding or cementing can mean substantial savings because: (1) tank cost is less, (2) it eliminates razing the original tank and (3) where tanks are inside buildings, there's no need to make changes in the structure to permit entry or removal of large tanks.

A fourth advantage is the safety factor offered by field farbication of plastic. Many old industrial tanks contain fumes and corrosive chemicals of an unknown nature.

Welding in or around such tanks sometimes results in explosion or accidents. This danger is practically nil when molding a tank lining of plastic resin.

Not Coating—Tanks up to 55-ft diam have been lined by the technique. These include tanks of steel, wood, and concrete. The lining is not a coating. In reality, it's a new plastic tank made by using the outside structure only as a mold. Actually, after a tank has been lined, the old structure may be removed, if desired.

Descales Stainless

A new process descales precipitation hardened 17-7 PH stainless steel after it has received the transformation hardening cycle. Announced by Turco Products, Inc., Los Angeles, it consists of three simple steps. After pre-cleaning, and prior to heat treating, a pretreatment coating is applied to metal surfaces. This prevents formation of tightly adhering oxides during heat treatment.

After heat treating, the user removes the coat along with heat treat oxides in a descaling solution. Finally a pressure rinse removes any residual oxides.

Holds Nuts Tight

Liquid sealants help a manufacturer hold its nuts and bolts together. The material hardens between metal surfaces and forms a tough plastic that keeps threaded parts tight.

Scovill Manufacturing Co., Waterbury, Conn., uses it to secure a nozzle assembly to the arm of a rotary lawn sprinkler which they make.

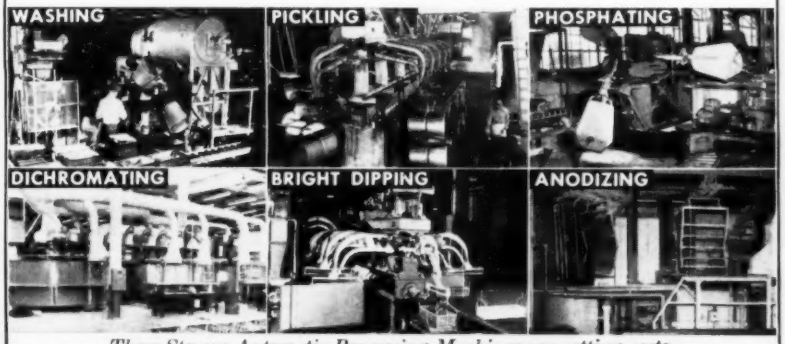
Solves Puzzle—The type of problem solved by the firm with the sealant is found in many kinds of equipment. Adjusting the nozzle tends to unscrew the threaded nipple attaching the nozzle to the sprinkler body. The nipple cannot be seated, since its height sets the

THE FINISHING TOUCH

A. B. HOEFER, *Vice-President*, FREDERIC B. STEVENS, INC.

AUTOMATIC IMMERSION PROCESSING RESULTS IN REAL SAVINGS!

MORE AND MORE, PROCESS ENGINEERS are recognizing the money savings to be realized from automatic processing installations, i.e. *Anodizing and other aluminum immersion treatments; Blackening; Bright Dipping; Dichromating; Cleaning; Pickling; Washing; Phosphating* for rust prevention; wear resistance, and prior to cold drawing; *Stripping* as well as *Electroplating.*



These Stevens Automatic Processing Machines are cutting costs.

"PROFIT-MAKING MACHINES" was one term recently used by a Stevens Automatic Machine user. Money saved in labor, floor space, production control and similar costs, if tacked on the other end, could very easily be termed "profit."

IN ANALYZING AUTOMATIC MACHINE USERS at Stevens for the past three years we were interested in the increased number of processing applications which manufacturers are adapting to this versatile equipment.

AUTOMATION HAS INFLUENCED THESE INCREASES, for our automatic machines fit ideally into "straight line" production layouts and eliminate handling and human error so costly in today's modern manufacturing techniques. All of our machines can be equipped with automatic load and unload features and have flexibility which enables them to be used for a variety of metal treatments.

IF YOU ARE A PROCESS ENGINEER, or occupy a similar post of responsibility in your plant, contact your Stevens sales engineer or write for more information on automatic immersion processing as well as electroplating. Let us show you how you can recommend methods to save your company money. Write: Frederic B. Stevens, Inc., 1800 Eighteenth Street, Detroit 16, Michigan.

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zero point of the nozzle. Stud fits won't do because the nozzle assembly will not withstand the high driving torques required.

The advantages of simply brushing on the sealant in this case are severalfold, says its users. First, it improves product quality, since the threaded nozzle never works loose. Second, it cuts costs; it eliminates other locking methods and saves on several minutes of labor on each lawn sprinkler assembled.

The company gets its sealant from American Sealants Co., Hartford, Conn.

How to Pick Draw Lube

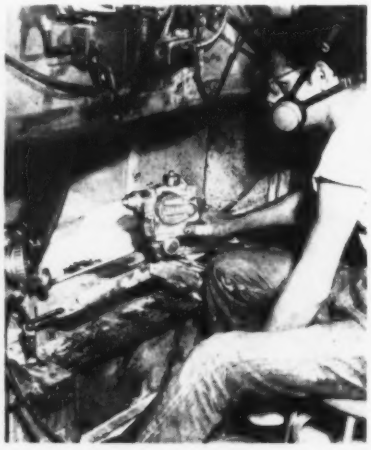
Choose your press drawing lubricants with care. So warns Leon Saltz, lubricants division manager of Magnus Chemical Co., Inc., Garwood, N. J. In a paper delivered before the American Society of Lubrication Engineers in Detroit, he points out that press forming lubricants are frequently known to their users only by trade designations. This results in a trial and error procedure being employed more often than can be justified in the light of technical information available, he says.

In an effort to help correct this, the firm is making available copies of the paper which extensively covers: oiliness agents, EP agents, emulsifiers, diluents and inhibitors.

Zinc Metallizing Halts Corrosion

Zinc metallizing affords long-term corrosion protection to one maker's pipe joint rings.

American Marietta Corp.'s ring shop fabricates steel joint rings for connecting large concrete pipes used in sewers and water lines. Until recently a problem faced them. This was how to protect the steel from corrosive agents during storage at construction sites. Almost as harassing was corrosion after installation as part of the pipe line construction. Since the firm



Metal sprayer metallizes steel parts with zinc.

works all over the world, the problem was especially vexing in certain locations.

The Answer — They now solve the corrosion problem by metallizing with zinc. This process permits high-speed production coating of all sizes ranging from 24 to 120 in. in diam. And reports Metallizing Engineering Co., Westbury, N. Y., it's an economical method, too.

Removes Rust, Scale

Featuring safety to material and personnel, a new powdered acid material removes rust, scale and corrosion from metal surfaces. Introduced by Oakite Products, Inc. of New York City, the dry compound adds to water in concentrations upwards of 8 oz to the gallon. It goes into solution fast and is useful in applications by circulation or immersion. Solutions of the compound may be used cold, or for faster action, heated to 165°F. It removes scale, scale-like deposits, rust, iron sulphides and other oxides. It requires no returnable carboys but is shipped in fiber drums.

for **Flat Parts** in rugged service

consider **steel plate**

Parts that must be strictly *flat* — of guaranteed accurate thickness and *tough* — often can be stamped from steel plate, economically, with excellent results. Here are a few examples — similar, perhaps, to some you use or are planning.

Heavy duty Washers **Rings**
Discs or Circles **Gear Blanks**
Sprocket Blanks **Special Bosses** **Drive Plates**
Special Shapes, your own design

If your steel part starts with a flat disc, for instance — we have stock dies for almost every fractional diameter up to 26½ inches. The heaviest blanking press in the Mid-west accommodates these dies, or those for special shapes to your design, stamping from plate 3/16" to 1-1/4" thick, depending on area.

Extra operations available: flame cutting of thicker plate, holes punched (up to .003" accuracy), machining, grinding, drilling and heat treating. Thirty-five hundred ton inventory of mild and high carbon plate . . . Send us your specifications — let us quote you on price and delivery.

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Rework your Monel ...it can give you years more pickling service

Look closely at this pickling crate separator pin.

See those go-nowhere threads and the weld beneath them? They tell a story. For years this piece of Monel* nickel-copper alloy has been used and re-used in pickling equipment. No one at Ingram-Richardson Manufacturing Co., Beaver Falls, Pa., can begin to tell all it has done.

But *this* they do know. Years ago they reworked the original piece. Made it and dozens of other Monel rods into separator pins. For at least 20 years, the metal has been in and out of the pickling bath.

Now look at the pin again. Sure, there are some signs of corrosion. But a nut on those Monel threads would *still* grip. And you can see the rod is sound as a dollar, good for many *more* years' service.

Wrought Monel alloy gives you important weight, safety, strength and design advantages in original equipment. After its original usefulness is dissipated, you can rework it and re-use it. Often several times.

Next time you order batch pickling fixtures, specify Monel nickel-copper alloy. In the meantime, get the newest Inco booklet, "Equipping the Pickle House." Write:

*Registered Trademark

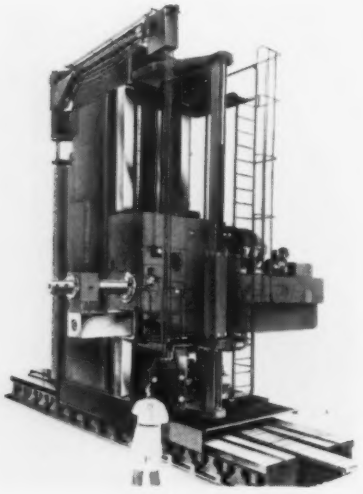
THE INTERNATIONAL NICKEL COMPANY, INC.
67 Wall Street New York 5, N. Y.

INCO TRADE MARK NICKEL ALLOYS

Monel . . . for proved pickling life

New Production Ideas

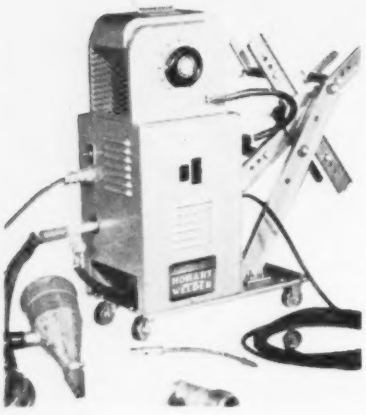
Equipment, Methods and Services



Big Horizontal Unit Bores, Drills and Mills

This large floor-type horizontal boring, drilling and milling machine has a 10-in. diam spindle and an 18-in. square underarm. Weighing over 200-tons, the precision unit is 27-ft high. It is particularly adaptable for machining large, heavy workpieces. This machine, available with either a 10, 12 or 14-in. diam spindle, is powered by a 100 or 150-hp main drive motor. Its manufacturer can furnish the floor-type setup with vertical headstock and horizontal travel to any desired specification. Designed for high-speed operation, making heavy cuts, the model has an all welded column of corrugated rib construction and a welded steel base providing extra rigidity to the 42-ton headstock. The unit has an over-all spindle speed range of 1.56 to 400 rpm through four back gears and a 4 to 1 adjustable speed motor. Two ranges of 0.002 to 0.50-in. and 0.50 to 120-ipm provide feed and traverse to the spindle and under-arm. (Gliddings & Lewis Machine Tool Co.)

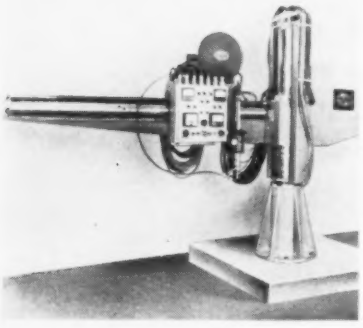
For more data circle No. 41 on postcard, p. 129



Semi-automatic Welder Is Compact, Lightweight

Semi-automatic, this submerged arc welder is compact and lightweight. It comes equipped with all controls and control power cable for plugging in on 110-v, either dc or ac; other equipment: wire reel, caster mounted base, carrying handles. It also includes a gun cable assembly with two welding guns. These are interchangeable. One is the flux type with a hopper and one is the open arc type for welding without flux. Steel cabinets protect the wire feed speed control rheostat and associated electrical components. These may be used as a single unit or separated for remote control. Each has its individual carrying handle. Bottom end openings and side panel louvres provide cooling. The unit is for use with any arc welder having continuous current to 500 amp., according to the manufacturer. (Hobart Bros. Co.)

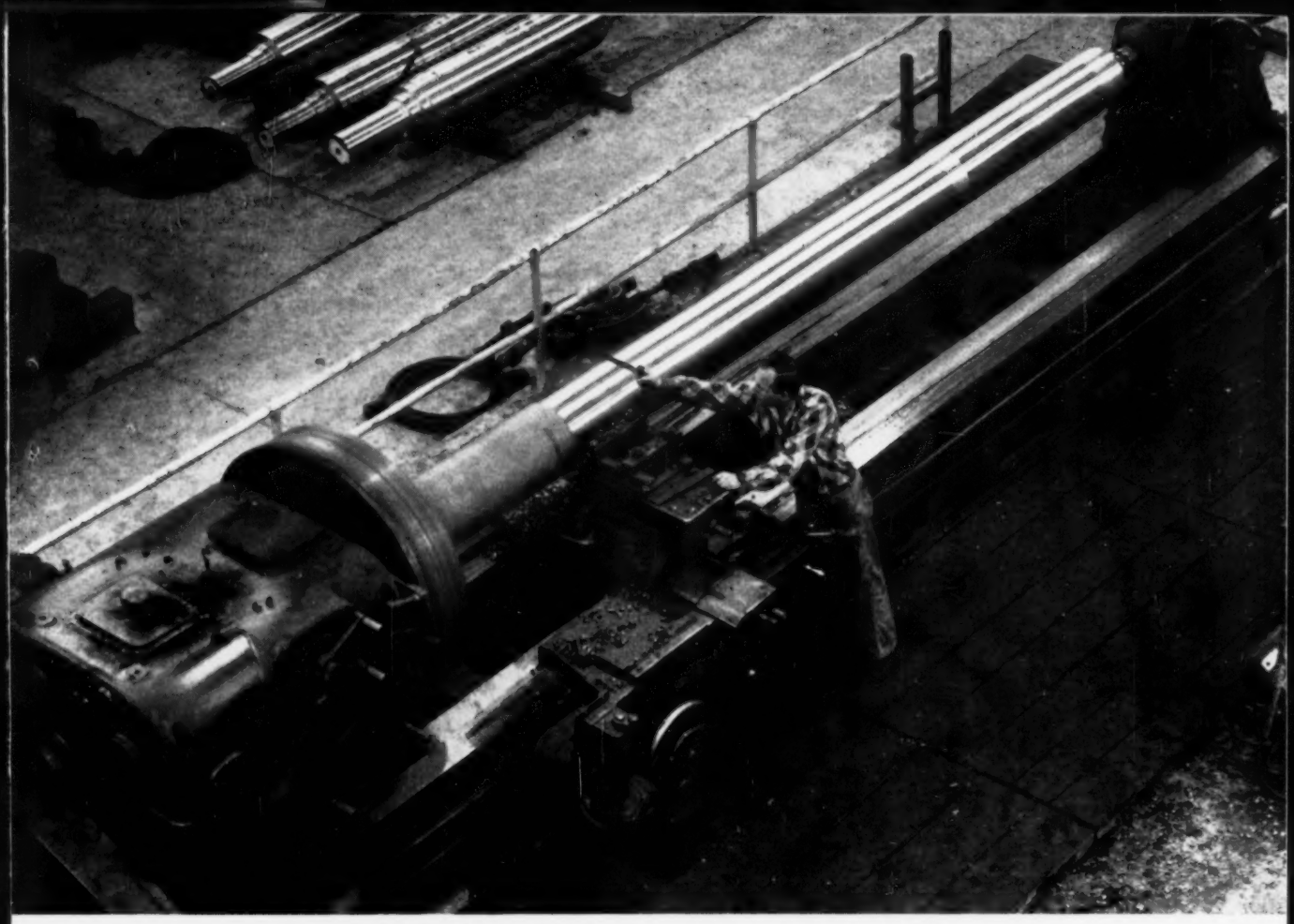
For more data circle No. 42 on postcard, p. 129



Welding Head Manipulator Positions Universally

This weldhead manipulator works with longitudinal and circumferential welding. It provides universal positioning and accurate variable speed traverse. Of all-welded construction, the setup is especially designed for precision welding applications on intricate parts. Both tungsten inert gas arc-welding and metal inert gas arc-welding automatic heads mount on the unit. An electrical console provides all the necessary controls for complete programming of the welding operation. Electronic timers provide sequence control. The console includes the welding power source with current slope control. (Air Reduction Sales Co.)

For more data circle No. 43 on postcard, p. 129



ALCO machinist checks dimension on press shaft at forging plant in Latrobe, Pa.

NEW FROM ALCO AT LATROBE: OPEN-DIE FORGINGS FOR INDUSTRY

Same ALCO steel, same intense quality control as ALCO circular forgings; Hi-Qua-Led-Steel® also available

ALCO now makes open-die forgings up to 40 ft long and 30,000 lb at its integrated Latrobe, Pa. plant. If you use open-die forgings, this means that quality forgings are now readily available for your product. Here are some of the advantages you can expect:

High uniformity among forgings of the same specifications. ALCO quality control continuously checks progress of each piece through production.

Exact conformance to your specifications. Even in steel chemistry, ALCO's open-hearth production of its own steel assures accurate carbon or additive content. Any AISI grade carbon or alloy is available.

Lower cost, especially if you do extensive machining. ALCO alone offers Hi-Qua-Led Steel forgings. They can lower your machining costs by as much as 50 per cent.

For more information contact the nearest ALCO sales office, or write Spring & Forge Division, Dept. OCF-4, P. O. Box 1065, Schenectady 1, N. Y.

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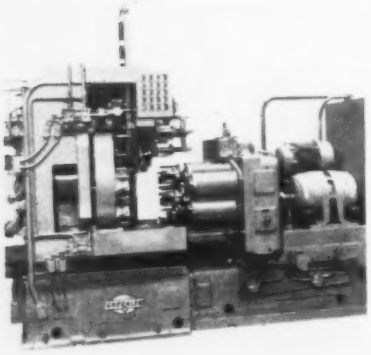
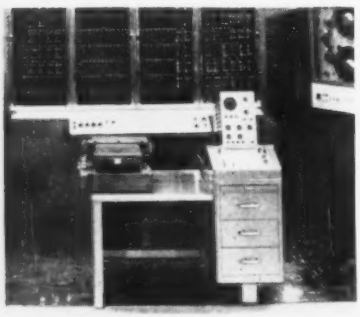


Horizontal Index Unit Machines Pipe Fittings

High-production machining of malleable-iron pipe fittings is done by this machine. The one-way, five-station horizontal automatic indexing unit feeds automatically. They feed four at a time into workholding fixtures at station one by a magazine-type loading arrangement. They are then automatically indexed into the remaining four stations where the following machining operations are performed: (1) two diameters are combination-bored, chamfered and rough counter-bored in the second station, (2) finish counter-boring and chamfering is performed in the third station, (3) tapping is done at station four and (4) parts unload at station five. It'll handle five sizes of pipe fittings. (Greenlee Bros. & Co.)

For more data circle No. 44 on postcard, p. 129



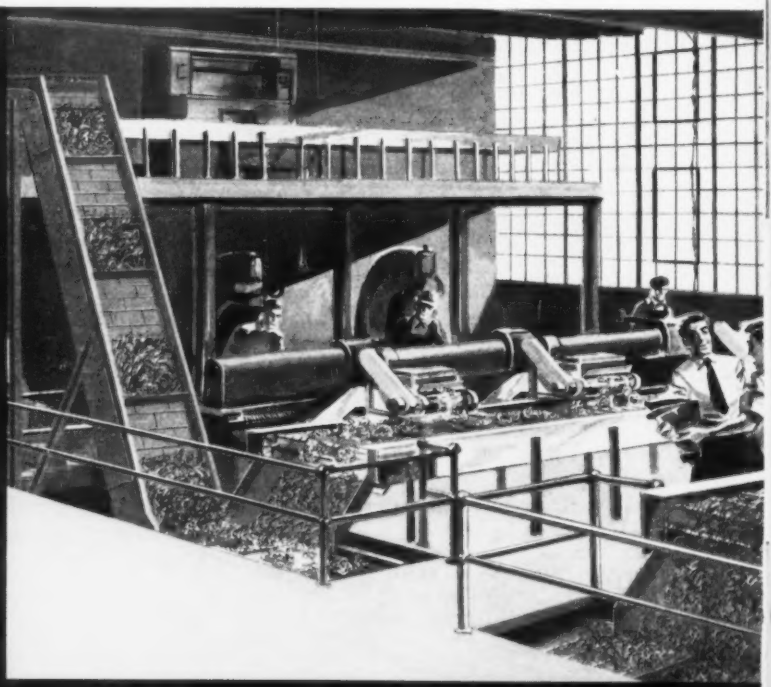
Computer Handles Research and Development Jobs

Research and developments problems are handled easily with this dual computer. Intended for use with small and intermediate firms or setups, the unit is highly flexible. It's easy to program and operate. A pure decimal machine with a built-in floating point, it is recommended for companies that cannot justify a unit for just research work. The machine's punched card and magnetic tape tie-in allows the computer to handle business data as well as the research work. It can process payroll, labor distribution, sales analyses, etc. (J. B. Rea. Co.)

For more data circle No. 45 on postcard, p. 129

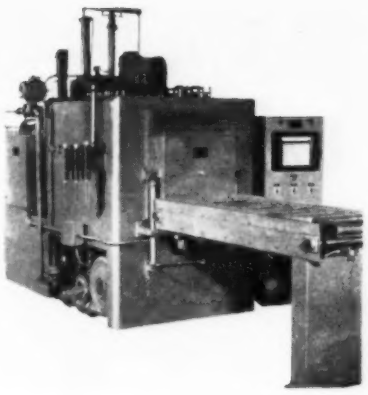
MAY-FRAN

Conveyor Standardization SAVES YOU MONEY...



NOW...

Heat-treat Furnace Performs Uniform Hardening



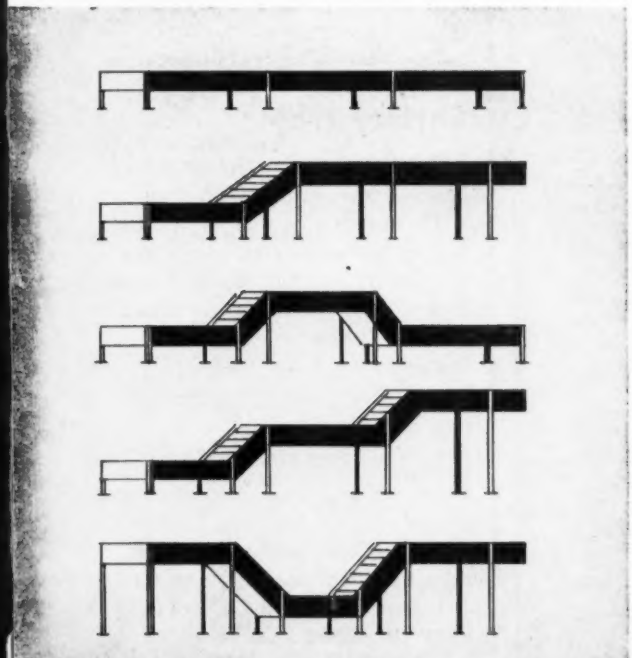
Basic unit of a new controlled atmosphere heat-treat system is this furnace. It performs clean hardening, carbon nitriding, carburizing, carbon restoration and annealing up to a maximum operating temperature of 1850°F. Its design provides for automatic straight-through work handling. A power pusher moves the work into the heating chamber; a separate pusher head transfers work to the rack in the quenching chamber. Quenching is completely automatic with a pneumatic cylinder raising and lowering the rack. High cooling capacity of the quench tank speeds operation and maintains uniform hardness. A two-stage, 300-gpm pump completely recirculates the quenching oil. A jet agitator system helps make hardening uniform. (Eclipse Fuel Eng. Co.)

For more data circle No. 46 on postcard, p. 129

Wheel-around Setup Moves Masonry Saw to Job

Highly movable, a wheel-around accessory is now available for use with one manufacturer's masonry saw. The mobile setup houses the maker's 2-hp sawing machine. Providing a quick, easy way to move the unit around on the job or in the plant, the accessory is instantly mobile. Wheels quickly attach, then retract or lower in seconds. Its handles recess when not in use. One man moves the unit with little effort. It'll go practically anywhere in the plant or even outside. The handy, comparatively fast-moving setup transports the firm's 2-hp masonry saw with a high-low control wheel and level-staying cutting head, according to the manufacturer. (The Clipper Mfg. Co.)

For more data circle No. 47 on postcard, p. 129



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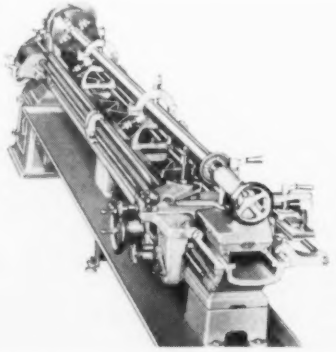
NEW EQUIPMENT

Long Bed Lathe

For machining tubing, shafting and other long work, a 16-in. x 14-ft lathe takes up to 129-in. between centers. Swing over cross slide is 9⅝-in. (11⅛-in. without chip guard). Maximum capacity over bed ways is 16¼-in. diam. A



raised lathe comes with swing over bed increased to 25⅛-in. Continuous X-bracing the entire length of the bed provides extreme rigidity. Hardened bed ways are optional. (South Bend Lathe Works).

For more data circle No. 48 on postcard, p. 129

Battery Tray

A new type "explosion-proof" battery lets electric lift trucks work in hazardous areas without fear of an accidental spark from the battery touching off a fire or explosion. It's approved by Underwriters' Laboratories. (C. & D. Batteries, Inc.)

For more data circle No. 49 on postcard, p. 129

Automatic Tube Gage

An automatic gaging machine checks wall and bottom thickness of tubing. It automatically separates them into good, rectifiable and rejected categories at the rate of 1000 units per hour. Aluminum tubes first feed into a chute. From here they transfer to a nest of rubber rolls rotating at approximately 600 rpm. As the tubes rotate, gaging contacts enter the open ends exploring the wall thickness on the

helix that is generated. At the end of the stroke, it measures bottom thickness. After the gaging slides retract at faster-than-gaging speed, the contacts operate two gage heads. These sort the tubes into classification conveyors which discharge them into bins of usable, rectifiable and rejected units. (Pratt & Whitney Co., Inc.)

For more data circle No. 50 on postcard, p. 129

Hydraulic Bar Feed

A new hydraulic bar feed is designed to feed stock accurately, even at high spindle speeds designed into late model single spindle screw machines. It features a compact, trouble-free unit. A short piston allows stock feeding at high spindle speeds without spindle stopping. With it, says its maker, there is a minimum of bar end waste and still only one feed-out is needed to feed parts any desired length. A signal light warns the operator when the machine run the operator when the machine runs almost out of stock. It comes in 3 32 to 1¾ in. capacities in three different size units. (Boyar-Schultz Corp.)

For more data circle No. 51 on postcard, p. 129

Comparator

This comparator helps machine operators to control closely high precision production setups. The

unit, for use on close tolerance grinding or lapping machines and with close tolerance segregating, provides two separate magnifications simultaneously without switch-

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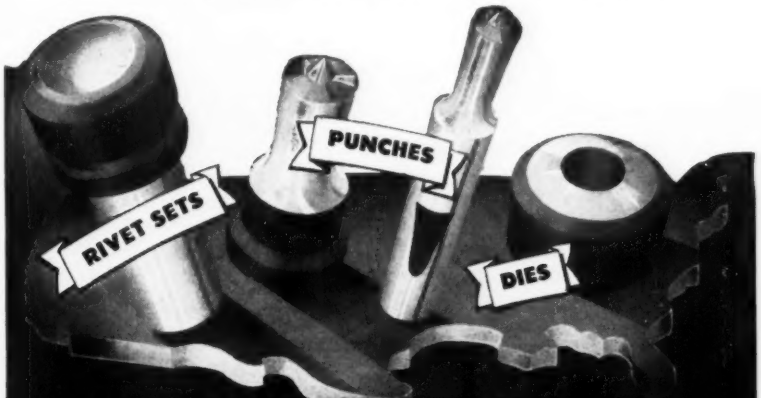

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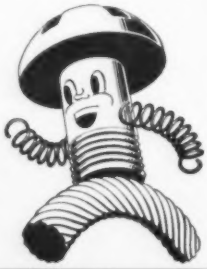


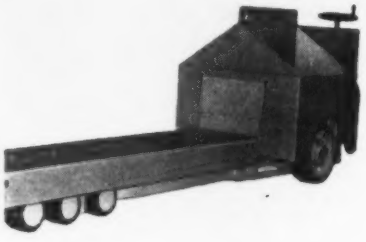
KEYSTONE WIRE *for Industry*

over. This allows the operator to use the low magnification scale during the preliminary stages of his work. He reads the deviation from final size to 0.0001-in. increments. As finished size is approached, the operator can observe the high magnification scale and read part size directly to within a few millionths. (Pratt & Whitney Co.)

For more data circle No. 52 on postcard, p. 129

Low-lift Truck

Of 20-000-lb capacity, a new low-lift platform truck handles odd-shaped and/or extra long loads, particularly where rugged duty is required. It comes for use with either electric or gasoline-electric power, has two-wheel drive and all-wheel steer. To insure good service, even under severe operation conditions, the frame is heavy steel plate, formed and electrically welded. It uses center sill construction. All major units attach directly to its heavily reinforced alloy steel bars which form the sills. A double-acting hydraulic cylinder raises the platform. The truck features a rocking link type platform lift. A safety link protects the lift mechanism if the platform rams against an obstruction. (Elwell-Parker Electric Co.)



For more data circle No. 53 on postcard, p. 129

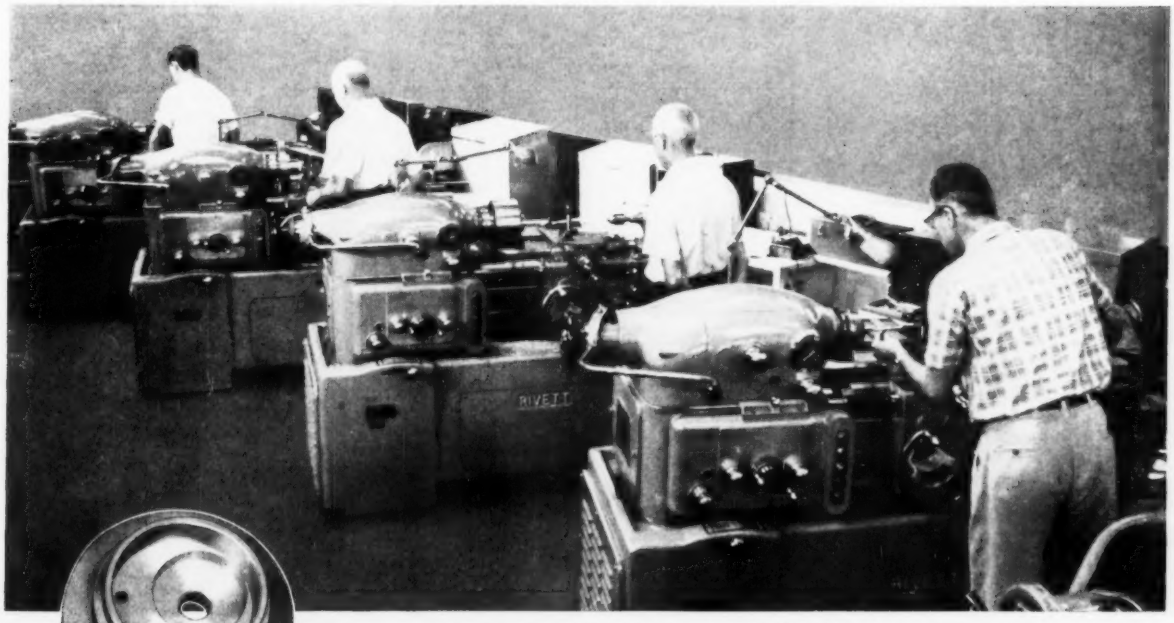
High-Vacuum Valve

A laboratory ultra-high vacuum valve handles pressures of 10^{-10} mm Hg and lower. It's for ultra-high

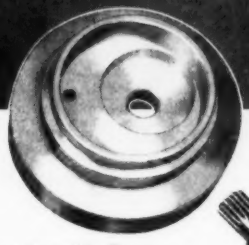
DAYSTROM
Electric Corp.

– puts it on a

RIVETT!



Battery of Rivett 1020S Lathes in the Research and Development Division of Daystrom Electric Corporation, Poughkeepsie, N. Y.



Brass piece with off-center counterbore and through-hole completely machined on a 1020S Rivett.

Machined on a 1020S from 4140 steel *after tempering* at a Rockwell hardness of C 20-25.

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Daystrom machines model parts with an eye to normal manufacturing methods. For this reason Daystrom highlights an important Rivett feature — productivity — in its statement:

"We have found that the Rivett 1020S Lathe is one of the most useful and all around productive machines in our model shop, and is so constructed that it is easy for an average operator to obtain the dimensions and finish necessary in our work."

"Model work requires holding concentricity to .001" T. I. R. between several diameters; turning is often held to several tenths. And, a finish of 32 micro inches and better is quite easily obtained!"

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vacuum system uses where non-contamination and the ability to be baked out are important. Effective conductance of the valve for nitrogen is only 1×10^{-11} liter per second. The valve seals a vacuum system from a diffusion pump without the contamination and inconvenience of a glass seal-off. (Rochester Div., Consolidated Electrodynamics Corp.)

For more data circle No. 54 on postcard, p. 129

Forged Tools

Non-magnetic, a new line of forged tools are non-corrosive and spark-resistant. The tools will replace the company's standard cast metal safety tools in cases where

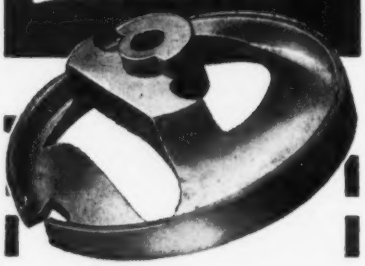
quantity production permits. They include: adjustable and box wrenches, pliers of various types, pneumatic tools, air hammer chisels and air hammer points. They are made of aluminum bronze alloys. (Ampco Metal, Inc.)

For more data circle No. 55 on postcard, p. 129

Operator-led Truck

In keeping with a trend toward producing shorter models, this operator-led industrial truck is only 35½-in. long. This is a 3¼-in. reduction over the maker's previous units of the same type and capacity. Highlighting compactness yet accessibility for service, the truck comes in two models. One's draw bar pull rates at 200 lb with an ultimate of 700 lb. Its companion has a normal draw bar pull of 400 lb with an ultimate of 700 lb. Their draw bar pull is double the normal rating on older

Cam Milling and Contour Machining Eliminated!



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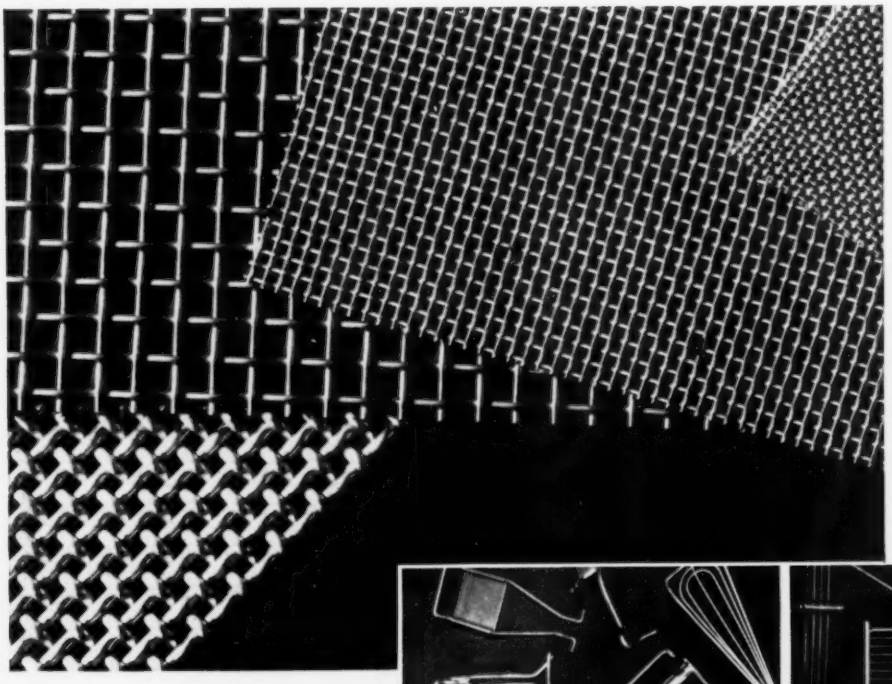

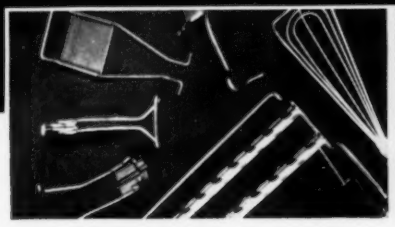

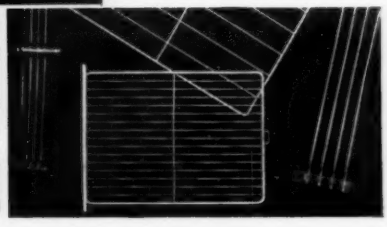

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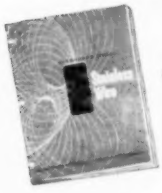

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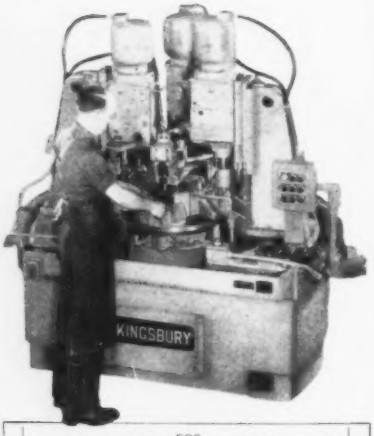

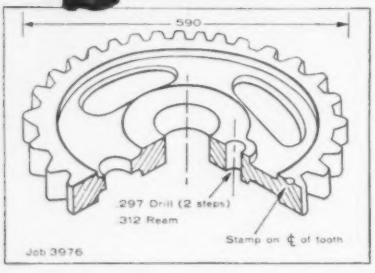

The operator merely loads and unloads this Kingsbury. The stamping device operates at his station. Two automatic units drill and one unit automatically reams. Drilling in two steps shortens the time cycle and increases production.

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KINGSBURY

INDEXING AUTOMATICS for high production drilling and tapping

NEW EQUIPMENT

trucks made by the company. The truck's shorter length is made possible through the use of a new all gear power unit. Due to the

equipment's compact design, the truck can make U-turns in a 4-ft aisle. (Automatic Transportation Co.)

For more data circle No. 56 on postcard, p. 129

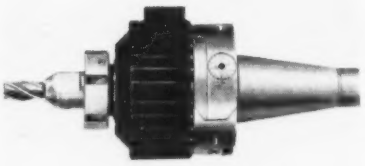
Small Motor

Completely balanced, a high performance stepping motor meets all standard shock and vibration requirements. The output shaft is positively locked into position after each actuation and cannot be rotated by external forces. Angular accuracy is within plus or minus ½°. Although it is ordinarily made to move bi-directionally in 36° steps (10 steps per revolution), it may be supplied in various other configurations. Maximum pulse rate is up to 60 per second. The torque is approximately 5-inch ounces in the 1½-in. diam x 2½-in. length motor. (Nemeth, Inc.)

For more data circle No. 57 on postcard, p. 129

End Mill Driver

This end mill driver has a provision for offset positioning which produces an orbital motion of the cutting tool. The orbital motion permits one-pass cutting of key ways with undersize end mills. It partially eliminates the need for special diameter sizes. The orbital (or eccentric) motion also increases



chip clearance, insures square slots and permits milling true-to-centerline on key ways. The orbital motion has the same speed as the spindle. (Portage Double-Quick, Inc.)

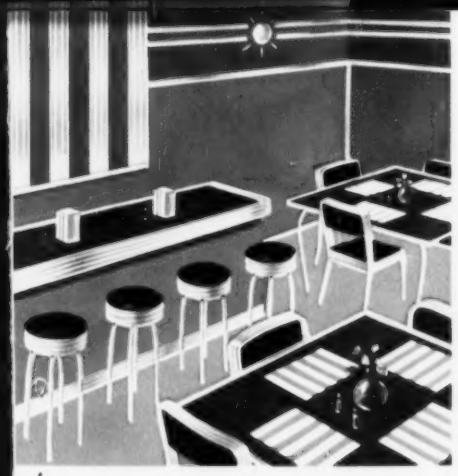
For more data circle No. 58 on postcard, p. 129

Center Gages

Critical center distances in a gear type fuel pump housing for jet engines are compared on air gages built especially for this application. Each gage utilizes a differential air meter which directly compares center distances on one dial reading. On one gage, the comparison is

made between bores of the housing and bronze insert bushings to determine if the flats on the bushings will have proper clearance when pressed into the housing. The other gage compares center distance of the housing bushings with that of similar bushings for the cover plate to assure precise alignment of bearing surfaces at final assembly. (Federal Products Corp.)

For more data circle No. 59 on postcard, p. 129



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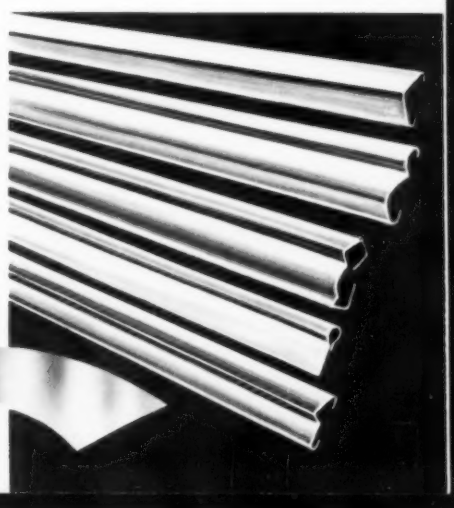

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- Hydrofluoric Acid Aqueous
- Hydrofluosilicic Acid
- Lead Fluoborate
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- Potassium Fluoride
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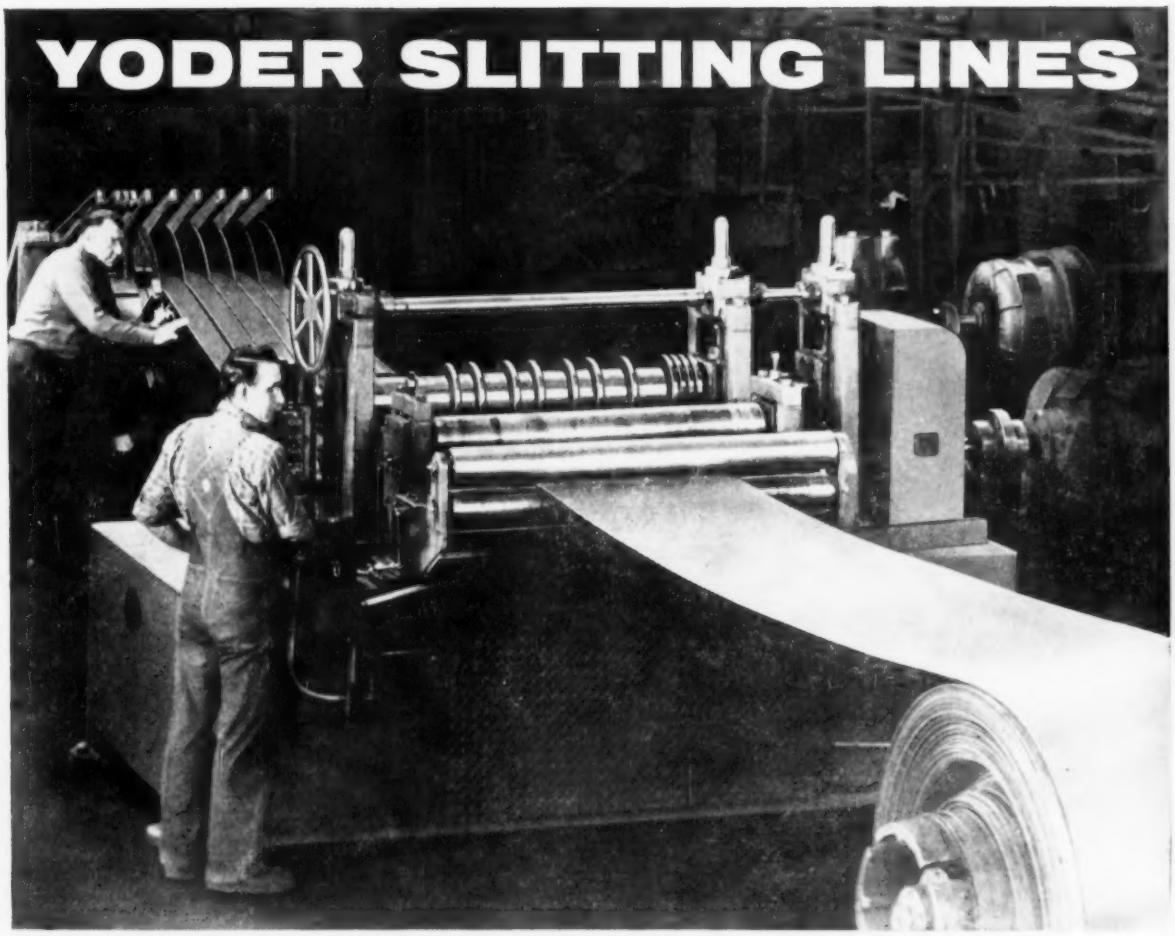
- Silico Fluorides
- Sodium Fluoborate
- Tin Fluoborate
- Zinc Fluoborate
- Zinc Fluoride

YODER SLITTING LINES



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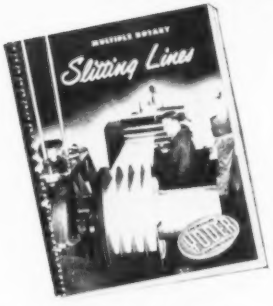


The Yoder Slitter Book is a comprehensive treatise on slitter operation and economics, with time studies, cost analyses and other useful data. It is yours for the asking.

In one plant, two Yoder tube mills and about 50 punch presses are being supplied with slit strands by one Yoder Slitting Line operated an average of only *seven hours per week.*

In another plant, a Yoder slitting line, *operated from six to eight hours per week,* is supplying two intermittently operated roll forming machines with total requirements averaging 100,000 feet per week.

These typical examples demonstrate, first, the big potential output of a relatively small, inexpensive Yoder standardized Slitting Line and, secondly, its big profitability. Assume production of only 35 tons of slit strands per 8 hour shift, one day per week, and the total per year would be 1750 tons. Estimating the saving in slitting cost at only one-half cent per lb., the total annual saving would be $17,500.00.

Besides the big convenience of doing your own slitting, such savings will often repay the investment in a few months.

THE YODER COMPANY 5510 Walworth Avenue • Cleveland 2, Ohio, U. S. A.

ENGINEERING **YODER** MANUFACTURING

ROTARY SLITTING LINES

COLD ROLL FORMING MACHINES

ELECTRIC-WELD PIPE AND TUBE MILLS

COLD FINISHED BARS

WIDEST SELECTION of kinds, shapes and sizes of cold finished carbon steel bars. Available anywhere—even the hard-to-get intermediate sizes.

LARGEST STOCKS—Nobody comes even close to equalling the size of our inventories which enable us to supply tons of one type and size.

HIGHEST QUALITY ASSURED—Produced to exacting quality standards, Ryerson cold finished bars are unmistakably identified by a scientific color-marking system, double checked by spark test and guarded by special racks, padded slings and protective wrapping.

FAST, DEPENDABLE SERVICE—Better than five out of every six orders for steel from Ryerson stock are shipped within 24 hours, and when emergency demands it you can count on even quicker delivery. So call your nearby Ryerson plant for every cold finished bar requirement.

RYERSON STEEL

COLD FINISHED BARS IN STOCK

Bars for general use: C1018, C1042

Turned, ground and polished shafting: C1025, C1045, C1141

Screw machine steel: Ledloy (the ultimate in free-machining steel), B1113, C1213, C1117 and leaded C1117

Machinery steel: Rycase (low carbon manganese steel), Leaded Rycase, Rytense (medium carbon manganese steel), Rytense Accuracy Stock, C1137, Ryco 44 and Stressproof (stress relieved medium carbon manganese steel)

Also every other kind of Carbon, Alloy and Stainless Steel

JOSEPH T. RYERSON & SON, INC. PLANTS AT: NEW YORK • BOSTON • WALLINGFORD, CONN. • PHILADELPHIA • CHARLOTTE • CINCINNATI CLEVELAND • DETROIT • PITTSBURGH • BUFFALO • CHICAGO • MILWAUKEE • ST. LOUIS • LOS ANGELES • SAN FRANCISCO • SPOKANE • SEATTLE

The Iron Age Summary

Mills Hope for August Upturn

Sheet and strip mills look hopefully for appliances and automotive to comeback in August.

Hedge buying against expected steel price rise may add extra fillip.

▪ Sheet and strip producers are now looking for a comeback in August. They're pinning their hopes on a pickup in automotive and appliance buying. They figure appliances will then be rebuilding inventories for the Christmas trade while automotive will be getting set for a new-model offensive.

In fact, a few mills this week detected a slight fluttering of the pulse from Detroit. One automaker jacked up his cold rolled sheet orders for June. Another moved tonnage scheduled for June into May. A third sent in a rush order to plug a hole in inventory.

Not a Trend—But mills generally look on this as little more than a nervous reaction—for the moment. Detroit still seems bent on holding their steel inventories to a minimum. Unless there is a sudden spurt in new car sales, automotive steel buying will be quiet.

Order backlogs are holding up fairly well—even better than had been expected. Some mills report incoming business has taken a turn for the better. And order cancellations are down. But at the same time other producers admit they are holding present operating rates only by borrowing on future business. This applies largely to sheet and strip mills.

Old Standbys Firm — Producers are getting some encouragement from indications that while some users are cutting steel inventories, their own business is good.

And meanwhile the old standbys of the market are still holding up. These include structurals, oil country goods and linepipe, and heavy plate. These products are drawing strong support from construction, shipbuilding, freight cars, and oil and gas. Light plate is not so tight as it was at year's end. Most mills are turning out light plate on sheet-strip mills—and glad to get the business.

Hedge Buying—The possibility of hedge buying against the expected July steel price increase is beginning to loom a little larger. Some mills say they already see signs that their customers are ordering for delivery before the July 1 price change. The hint that prices may rise more than some estimates to date could stimulate more hedge buying than had been looked for earlier. (See page 75.)

Iron and steel scrap prices have taken another turn for the better. The mills seem willing to pay more for the better grades of scrap—and this could reflect confidence in a third quarter upturn in steel demand.

Steel Output, Operating Rates

Production (Net tons, 000 omitted)	This Week 2,240	Last Week 2,226	Month Ago 2,343	Year Ago 2,388
Ingot Index (1947-1949=100)	139.4	138.6	145.8	149.7
Operating Rates				
Chicago	85.5	87.0	90.0	100.0
Pittsburgh	93.0	90.0*	96.0	101.0
Philadelphia	102.0	100.0*	102.0	105.0
Valley	81.0	82.0*	87.0	98.0
West	104.0	100.0*	102.0	105.0
Buffalo	85.5	95.0	93.0	105.0
Cleveland	85.0	86.0*	86.0	102.0
Detroit	87.0	90.0	96.0	95.0
S. Ohio River	67.0	64.0	63.0	91.0
South	95.5	95.0	96.0	23.5
Upper Ohio R.	83.5	92.0	95.0	99.0
St. Louis	84.0	90.0	101.0	97.0
Northeast	63.0	64.0	66.0	73.0
Aggregate	87.5	87.0	91.5	97.0

*Revised

Prices At A Glance

(cents per lb unless otherwise noted)

	This Week	Week Ago	Month Ago	Year Ago
Composite price				
Finished Steel, base	5.670	5.670	5.670	5.179
Pig Iron (Gross ton)	$64.56	$64.56	$64.56	$60.29
Scrap, No. 1 hvy (Gross ton)	$44.17	$42.83	$42.67	$53.17
Nonferrous				
Aluminum ingot	27.10	27.10	27.10	25.90
Copper, electrolytic	32.00	32.00	32.00	46.00
Lead, St. Louis	15.80	15.80	15.80	15.80
Magnesium ingot	36.00	36.00	36.00	34.50
Nickel, electrolytic	74.00	74.00	74.00	64.50
Tin, Straits, N. Y.	98.50	98.50*	99.125	97.875
Zinc, E. St. Louis	12.00	13.50	13.50	13.50

*Revised

Jobbers Bypassed On Rush Orders

Some buyers, filling inventory gaps, are trying to get rapid mill deliveries.

They're aiming for fast service on emergency requests at mill prices.

▪ Consumers, interested in placing rush orders to fill depleted sheet and bar inventories, are trying for rapid delivery at mill prices.

When they need emergency tonnages, they're showing a tendency to bypass normal jobber channels and go right to the mills. And while not pleased to be acting as warehousers, some mills are taking such orders. With tonnage gaps still present on June order books the business is occasionally welcome.

Policy, Not Sales, Blamed—While the current market allows users to pretty much call their ordering shots, their attitude seems dictated by policy, not by a falloff in sales. When asking the mills to defer orders, users frequently make it clear that poor business is not the reason, just a desire to keep inventories trim.

A leading producer, surveying customers on order cutbacks, found few who blamed it on poor business. It's just an inventory philosophy which the present market makes easy to follow.

Sheet and Strip — Almost all sheet products, regardless of the amount of finishing needed are available on 4-5 week delivery. Only rush orders to plug inventory gaps are helping.

A leading **Pittsburgh** producer indicates that operating rates have been kept up only by advancing orders and borrowing on future business. May sheet and strip ordering there is on a par with April's, and June isn't expected to show any improvement.

Cleveland mills still have May hot-rolled sheet available if the sizes are the same as other tonnage being rolled. Only about half the June capacity for cold-rolled sheet has been booked. And there's little inclination on the part of buyers to come in to the market for third quarter sheet tonnage.

Early June delivery is quoted by one producer selling in the **Philadelphia** area on all types of sheet and strip. Consumers are being contacted by mills they normally don't hear from and by out-of-the-area brokers offering sheet at cut prices.

West Coast warehousemen who bought a lot of sheet from the East are finding themselves in a tough spot. Customers, knowing about the supply glut, are cutting inventories way back.

Cold-rolled sheet and strip continues available on 3-4 week delivery at **Chicago.** Hot-rolled takes about 4-5 weeks. Mills that booked strip mill plate in the second quarter are glad to have it now as ordering continues strong for this product.

Bar—Pittsburgh area mills report export business is helping them take up the slack in the market. Some mills are running into trouble in attempts to roll small structural angles. Most standard sizes and shapes of hot-rolled bar are available within 5 weeks. Cold-finished bar can be had from stock or in from 3 to 4 weeks.

Inventory worries are keeping **Philadelphia** area customers from doing any substantial buying. One alloy bar buyer in moving June tonnage back to August listed large stocks as the reason.

Strong demand for automotive bars on the **West Coast** is keeping mills going at capacity rates.

Hot-rolled bar deliveries at **Chicago** may take six weeks from the mills, although cold-finished is usually available right from stock. Customers needing bar in a rush still won't go to warehouse to get rapid warehouse service. They want rapid mill service at mill prices.

Plate and Structurals — Plates under 3/8 in. thick and 73 in. wide have become more plentiful at **Pittsburgh** but two producers there are booked through June on them anyway. Mills are now booking July and August tonnage.

Practically all mills in the **Cleveland** area have taken on light plate tonnage, some of it up to 1 in. thick. This despite the fact that light plate has become such a glut on the market customers are rescheduling May tonnage into June.

Light plate is still moving fairly well in the **Philadelphia** market although not as strongly as previously. Heavier and wider plates, as well as structurals, continue tight.

Structural backlogs at **West Coast** mills are as large as ever, however it's taking a little more sales work to keep them up.

At **Chicago,** ¼ in. plate in narrow widths is readily available and frequently can be had on 4 week delivery. However, product over ½ in. usually requires 6-8 weeks and heavier material is strictly on a quota basis.

Canadian Prices—Steel users above the border are now paying $4-6 dollars more a ton for their products. Increases (in cents per 100 lb) are as follows: plate—30; hot-rolled sheet — 20; cold-rolled sheet — 30; hot-rolled strip — 50; and cold-rolled strip—30.

COMPARISON OF PRICES

(Effective May 7, 1957)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*.

	May 7 1957	Apr. 30 1957	Apr. 9 1957	May 8 1956
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	4.675¢	4.675¢	4.675¢	4.325¢
Cold-rolled sheets	5.75	5.75	5.75	5.325
Galvanized sheets (10 ga.)	6.30	6.30	6.30	5.85
Hot-rolled strip	4.675	4.675	4.675	4.325
Cold-rolled strip	6.870	6.870	6.870	6.28
Plate	4.87	4.87	4.87	4.52
Plates, wrought iron	10.40	10.40	10.40	10.40
Stainl's C-R strip (No. 302)	50.00	50.00	50.00	44.50
Tin and Terneplate: (per base box)				
Tinplate (1.50 lb.) cokes	$10.30	$10.30	$9.95	$9.85
Tin plates, electro (0.50 lb.)	9.00	9.00	8.65	8.55
Special coated mfg. ternes	9.55	9.55	9.20	9.10
Bars and Shapes: (per pound)				
Merchant bars	5.075¢	5.075¢	5.075¢	4.65¢
Cold finished bars	6.85	6.85	6.85	5.90
Alloy bars	6.125	6.125	6.125	5.65
Structural shapes	5.00	5.00	5.00	4.60
Stainless bars (No. 302)	43.25	43.25	43.25	38.25
Wrought iron bars	11.50	11.50	11.50	11.50
Wire: (per pound)				
Bright wire	7.20¢	7.20¢	7.20¢	6.60¢
Rails: (per 100 lb.)				
Heavy rails	$5.275	$5.275	$5.275	$4.725
Light rails	6.25	6.25	6.25	5.65
Semifinished Steel: (per net ton)				
Rerolling billets	$74.00	$74.00	$74.00	$68.50
Slabs, rerolling	74.00	74.00	74.00	68.50
Forging billets	91.50	91.50	91.50	84.50
Alloy blooms, billets, slabs	107.00	107.00	107.00	96.00
Wire Rod and Skelp: (per pound)				
Wire rods	5.80¢	5.80¢	5.80¢	5.025¢
Skelp	4.625	4.625	4.625•	4.225
Finished Steel Composite: (per pound)				
Base price	5.670¢	5.670¢	5.670¢	5.179¢

	May 7 1957	Apr. 30 1957	Apr. 9 1957	May 8 1956
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	$68.88	$68.88	$68.88	$65.26
Foundry, Valley	65.00	65.00	65.00	60.50
Foundry, Southern Cin'ti	67.17	67.17	67.17	62.93
Foundry, Birmingham	59.00	59.00	59.00	55.00
Foundry, Chicago	65.00	65.00	65.00	60.50
Basic, del'd Philadelphia	68.38	68.38	68.38	64.48
Basic, Valley furnace	64.50	64.50	64.50	60.00
Malleable, Chicago	65.00	65.00	65.00	60.50
Malleable, Valley	65.00	65.00	65.00	60.50
Ferromanganese, cents per lb‡ 74 to 76 pct Mn base.	12.75¢	12.75¢	12.75¢	9.50¢
Pig Iron Composite: (per gross ton)				
Pig iron	$64.56	$64.56	$64.56	$60.29
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	$44.50	$42.50	$41.50	$51.50
No. 1 steel, Phila. area	48.50	47.50	47.00	55.50
No. 1 steel, Chicago	39.50	38.50	39.50	52.50
No. 1 bundles, Detroit	39.00	34.50	34.50	49.50
Low phos., Youngstown	46.50	44.50	41.50	59.50
No. 1 mach'y cast, Pittsburgh	52.50	51.50	49.50	57.50
No. 1 mach'y cast, Philadel'a	55.50	55.50	55.50	55.50
No. 1 mach'y cast, Chicago	45.50	45.00	45.50	54.50
Steel Scrap Composite: (per gross ton)				
No. 1 heavy melting scrap	$44.17	$42.83	$42.67	$53.17
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$15.38	$15.38	$15.38	$14.50
Foundry coke, prompt	$17.50-$19	$17.50-$19	$17.50-$19	$17.00
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	32.00	32.00	32.00	46.00
Copper, Lake, Conn.	32.00	32.00	32.00	46.00
Tin, Straits, New York	98.50†	98.50•	99.125	97.875
Zinc, East St. Louis	*12.00*	13.50	13.50	13.50
Lead, St. Louis	15.80	15.80	15.80	15.80
Aluminum, virgin ingot	27.10	27.10	27.10	25.90
Nickel, electrolytic	74.00	74.00	74.00	64.50
Magnesium, ingot	36.00	36.00	36.00	34.50
Antimony, Laredo, Tex.	33.00	33.00	33.00	33.00

† Tentative. ‡ Average. • Revised.

Finished Steel Composite

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Steel Scrap Composite

Averages of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Birdsboro, Pa. *B6*	66.50	67.00	67.50	68.00	.....
Birmingham *R3*	58.50	59.00•	.....	.....	.....
Birmingham *W9*	58.50	59.00•	63.00	.....	.....
Birmingham *U4*	58.50	59.00•	63.00	.....	.....
Buffalo *R3*	64.50	65.00	65.50	66.00	.....
Buffalo *H1*	64.50	65.00	65.50	66.00	.....
Buffalo *W6*	64.50	65.00	65.50	66.00	.....
Chester *P2*	66.50	67.00	67.50	.....	.....
Chicago *I4*	64 50	65.00	65.00	65.50	.....
Cleveland *A5*	64.50	65.00	65.00	65.50	69.50†
Cleveland *R3*	64 50	65.00	65.00	65.50	.....
Duluth *I4*	64.50	65.00	65.00	65.50	69.50†
Erie *I4*	64.50	65.00	65.00	65.50	69.50†
Everett *M6*	66.00	66.50	67.00	.....	.....
Fontana *K1*	72.50	73.00	.....	.....	.....
Geneva, Utah *C7*	64 50	65.00	.....	.....	.....
Granite City *G2*	66.40	66.90	67.40	.....	.....
Hubbard *Y1*	.....	.....	65.00	.....	.....
Ironton, Utah *C7*	64.50	65.00	.....	.....	.....
Midland *C11*	64.50	.....	.....	.....	.....
Minnequa *C6*	66.50	67.00	67.50	68.00	.....
Monessen *P6*	64.50	.....	.....	.....	.....
Neville Is. *P4*	64.50	65.00	65.00	65.50	69.50†
N. Tonawanda *T1*	.....	65.00	65.50	66.00	.....
Sharpsville *S3*	64.50	65.00	65.00	65.50	.....
So. Chicago *R3*	64.50	65.00	65.00	.....	.....
Swedeland *A2*	66.50	67.00	67.50	68.00	.....
Toledo *I4*	64.50	65.00	65.00	65.50	.....
Troy, N. Y. *R3*	66.50	67.00	67.50	68.00	72.50
Youngstown *Y1*	.....	.....	65.00	65.50	.....

DIFFERENTIALS: Add, 75¢ per ton for each 0.25 pct silicon or portion thereof over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.25 pct manganese or portion thereof over 1 pct, $2 per ton for 0.5 to 0.75 pct nickel, $1 for each additional 0.25 pct nickel. • Add $1.00 for 0.31–0.69 pct phos. † Intermediate low phos. ‡ Add $1.00 for 0.31 to 0.50 pct phos.

Silvery Iron: Buffale (6 pct), *H1*, $78.50; Jackson, *J1, I4* (Globe Div.), $77.25; Niagara Falls (15.01-15.50), $101.00; Keokuk (14.01–14.50), $103.50; (15.51–16.00), $106.50. Add $1.00 per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 18 pct. Add $1.25 for each 0.50 pct manganese over 1.00 pct. Bessemer silvery pig iron (under .10 pct phos.): $64.00. Add $1.00 premium for all grades silvery 6 pct to 14 pct.

STAINLESS STEEL

Base price cents per lb f.o.b. mill

←To identify producers, see Key on P. 179→

Product	201	202	301	302	303	304	316	321	347	403	410	416	430
Ingots, reroll.	21.25	22.75	22.25	24.25	—	26.00	38.25	31.00	35.50	—	18.00	27.75	18.25
Slabs, billets	26.00	29.00	27.00	30.25	30.75	32.00	47.50	38.50	44.75	—	28.75	—	21.00
Billets, forging	—	35.00	35.75	36.50	39.50	39.00	59.75	45.25	53.50	30.75	27.25	27.75	27.75
Bars, struct.	40.50	41.25	42.50	43.25	46.25	46.00	70.25	53.25	62.25	36.25	32.50	33.00	33.00
Plates	42.50	43.25	44.50	45.50	48.00	48.75	73.75	57.50	67.00	38.75	33.75	35.50	34.50
Sheets	46.75	47.25	49.25	50.00	—	53.25	78.25	63.00	76.25	46.50	38.75	46.50	39.25
Strip, hot-rolled	34.50	37.50	35.75	39.00	—	42.50	66.50	51.50	61.00	—	29.75	—	30.75
Strip, cold-rolled	43.25	47.25	45.75	50.00	—	53.25	78.25	63.00	76.25	46.50	38.75	46.50	39.25
Wire CF; Rod HR	—	39.25	40.25–40.50	41.00–41.25	44.00	43.75	66.75–67.00	50.50–51.00	59.25–59.50	34.50	31.00	31.50	31.00

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., *C11;* Brackenridge, Pa., *A3;* Butler, Pa., *A7;* Vandergrift, Pa., *U1;* Washington, Pa., *W3, J3;* Baltimore, *E1;* Middletown, O., *A7;* Massillon, O., *R3;* Gary, *U1;* Bridgeville, Pa., *U2;* New Castle, Ind., *I2;* Ft. Wayne, *J4.*

Strip: Midland, Pa., *C11;* Waukegan, Cleveland, *A5;* Carnegie, Pa., *S9;* McKeesport, Pa., *F1;* Reading, Pa., *C2;* Washington, Pa., *W2;* W. Leechburg, Pa., *A3;* Bridgeville, Pa., *U2;* Detroit, *M2;* Canton-Massillon, O., *R3;* Harrison, N. J., *D3;* Youngstown, *C5;* Sharon, Pa., *S1;* Butler, Pa., *A7;* Wallingford, Conn., *U3* (plus further conversion extras); *W1;* New Bedford, Mass. (.25¢ per lb higher), *R6;* Gary, *U1* (.25¢ per lb higher).

Bar: Baltimore, *A7;* S. Duquesne, Pa., *U1;* Munhall, Pa., *U1;* Reading, Pa., *C2;* Titusville, Pa., *U2;* Washington, Pa., *J2;* McKeesport, Pa., *U1, F1;* Bridgeville, Pa., *U2;* Dunkirk, N. Y., *A3;* Massillon, O., *R3;* S. Chicago, *U1;* Syracuse, N. Y., *C11;* Watervliet, N. Y., *A3;* Waukegan, *A5;* Canton, O., *T5;* Ft. Wayne, *I4;* Philadelphia, *D5;* Detroit, *R5;* Gary, *U1.*

Wire: Waukegan, *A5;* Massillon, O., *R3;* McKeesport, Pa., *F1;* Ft. Wayne, *J4;* Harrison, N. J., *D3;* Baltimore, *A7;* Dunkirk, *A3;* Monessen, *P1;* Syracuse, *C11;* Bridgeville, *U2.*

Structurals: Baltimore, *A7;* Massillon, O., *R3;* Chicago, Ill., *J4;* Watervliet, N. Y., *A3;* Syracuse, *C11;* S. Chicago, *U1*

Plates: Brackenridge, Pa., *A3;* Chicago, *U1;* Munhall, Pa., *U1;* Midland, Pa., *C11;* New Castle, Ind., *I2;* Middletown, *A7;* Washington, Pa., *J2;* Cleveland, Massillon, *R3;* Coatesville, Pa., *C15;* Philadelphia, *D5;* Vandergrift, Pa., *U1;* Gary, *U1.*

Forgings billets: Midland, Pa., *C11;* Baltimore, *A7;* Washington, Pa., *J2;* McKeesport, *F1;* Massillon, Canton, O., *R3;* Watervliet, *A3;* Pittsburgh, Chicago, *U1;* Syracuse, *C11;* Detroit, *R5;* Munhall, Pa., S. Chicago, *U1.*

New Strength Boosts Scrap Prices

Question is how far market will rebound after end of three months decline.

Dealer inventories are low, but uncertainty about steel operations complicates market forecasting.

■ A firming market consolidated its gains and began to advance, ending a three months decline.

In spite of the sharp comeback in some markets, most of the trade thought a runaway market unlikely. The lower rate of steel operations and uncertainty about the third quarter probably will prevent a repetition of anything like the record prices of last December.

The market generally is much stronger. Dealer inventories are still low, and higher prices are forecast in most markets to bring out any significant tonnages.

Eastern markets are concerned over a stop order, halting at least temporarily, further exports of heavy melting grades of scrap. It is expected that licensing will be stopped until the U. S. gets an agreement from the Japanese, United Kingdom, and the European Coal and Steel Community to hold exports of heavy melting to requested limits.

Price increases in all major markets sent THE IRON AGE Composite Price up to $44.17.

Pittsburgh — A major mill has bought openhearth scrap at $45.00 for No. 1 heavy melting, $42.00 for No. 2 heavy melting and $40.00 for No. 2 bundles. The figures represent a gain over the last mill buy of $3.00 for No. 1 heavy melting and $5.00 for the secondary grades. Prices of low phos, factory bundles and turnings are up $1.00 in sympathy. The whole market looks stronger as two large mill buys have come at a time when yard stocks and collections are low.

Chicago—Prices began to advance late last week with purchases of No. 1 grades. Broker buying continues to advance, with some concern that new orders at present levels will become "bad orders" in the near future. Attempts to build inventories at the broker - dealer level have not met with success.

Philadelphia — A mill buy of No. 1 heavy melting at $49 and No. 2 bundles at $39 sent primary and secondary steelmaking grades up a dollar. There were signs of strengthening in the turnings market, but cast iron was barely holding the price line. Little scrap was reported coming into the yards.

New York—Prices of steelmaking grades rose $1 on the basis of a mill buy in an adjacent area. No. 2 dealer bundles also were up $1. On the whole, this market shows signs of strength.

PURCHASING AGENT'S CHECKLIST

Take the guesswork out of inventory control. **P. 70**

How to buy materials handling equipment. **P. 74**

Will steel prices rise more than expected? **P. 75**

Detroit — The market showed continued evidence of firming. Broker buying prices increased on No. 1 and No. 2 grades on the strength of both local and out-of-town orders. Reason for the firming: The original price correction was too severe.

Cleveland — The Valley market rose $4 for primary and secondary grades on purchases last week. No. 2 bundles, long a glut on the market, have become scarce since sources have dried up. Cleveland rose in sympathy but the local market remains quiet.

St. Louis—The market is firmed up at unchanged prices. Receipts have dropped sharply, with those who have material holding for higher prices.

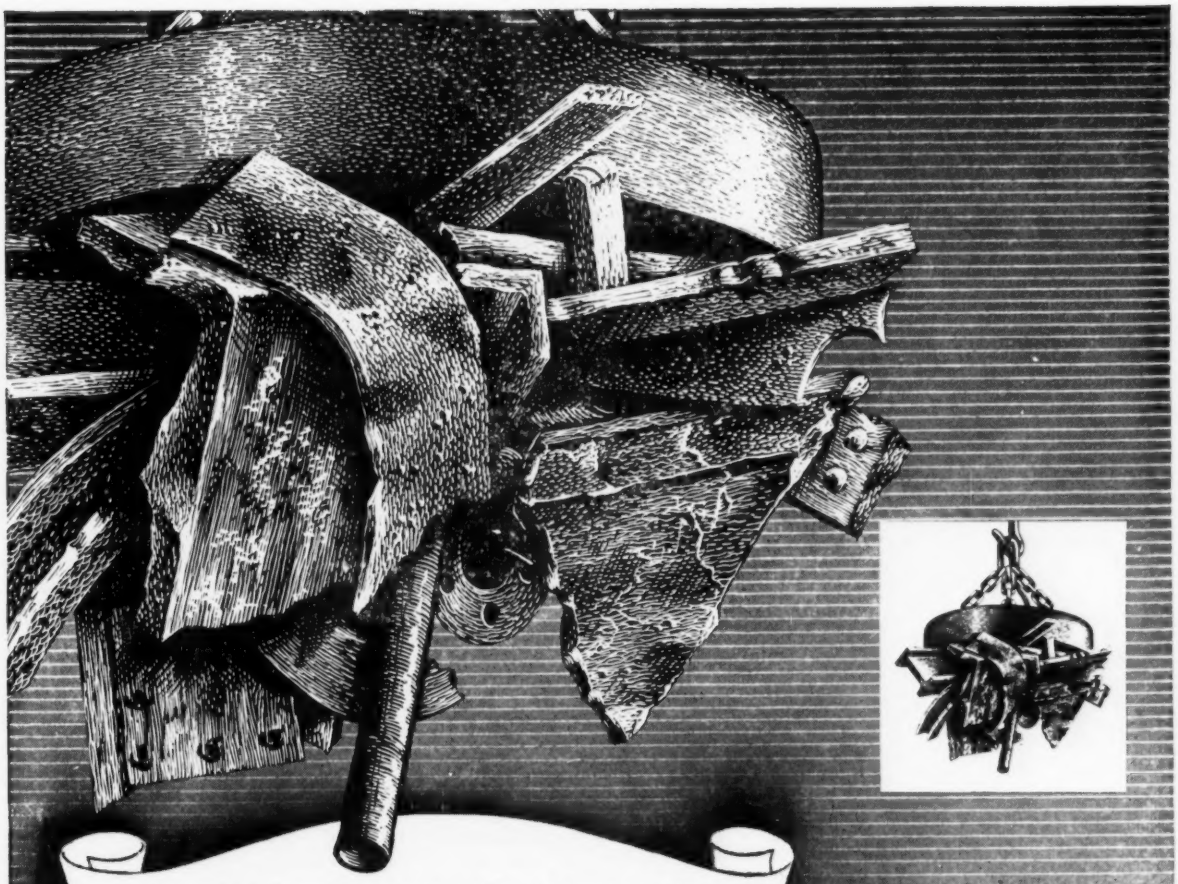
Birmingham — The market remains quiet, with only moderate buying for local consumption at unchanged prices. Dealer resistance to present prices is growing. Even some railroads are refusing to sell at present prices. Export is quiet.

Cincinnati — Local industrial lists have made a slow advance thanks to successful out-of-district bids. Indications are the trend will continue. Dealer stocks are just about cleaned out and the dealers who have an inventory are holding back for a price increase.

Buffalo—Prices of No. 1 grades dipped $1 on the basis of substantial purchases by the area's major mill. Four more openhearths were shut down last week. Scrap men fear the shutdown of more furnaces may depress prices further.

Boston—For the first time in two months, primary scrap grades advanced $1. One eastern Pennsylvania mill has come into the market, bolstering the market moderately for No. 1 grades.

West Coast—No. 1 heavy melting dropped $2 a ton in Los Angeles and Seattle. San Francisco prices are unchanged, but the market is weak all along the Coast.



A SYMBOL OF LEADERSHIP IN IRON & STEEL SCRAP SINCE 1889

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SCRAP PRICES *(Effective May 7, 1957)*

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Pittsburgh

No. 1 hvy. melting	$44.00 to $45.00
No. 2 hvy. melting	41.00 to 42.00
No. 1 dealer bundles	44.00 to 45.00
No. 1 factory bundles	50.00 to 51.00
No. 2 bundles	39.00 to 40.00
No. 1 busheling	44.00 to 45.00
Machine shop turn.	30.00 to 31.00
Mixed bor and mx. turn.	30.00 to 31.00
Shoveling turnings	34.00 to 35.00
Cast iron borings	34.00 to 35.00
Low phos. punch'gs plate	49.00 to 50.00
Heavy turnings	42.00 to 43.00
No. 1 RR. hvy. melting	48.00 to 49.00
Scrap rails, random lgth.	61.00 to 62.00
Rails 2 ft and under	66.00 to 67.00
RR. steel wheels	58.00 to 59.00
RR. spring steel	58.00 to 59.00
RR. couplers and knuckles	58.00 to 59.00
No. 1 machinery cast.	52.00 to 53.00
Cupola cast.	44.00 to 45.00
Heavy breakable cast.	42.00 to 43.00

Chicago

No. 1 hvy. melting	$39.00 to $40.00
No. 2 hvy. melting	37.00 to 38.00
No. 1 dealer bundles	40.00 to 41.00
No. 1 factory bundles	45.00 to 47.00
No. 2 bundles	33.00 to 34.00
No. 1 busheling	39.00 to 40.00
Machine shop turn.	23.00 to 24.00
Mixed bor. and turn.	25.00 to 26.00
Shoveling turnings	25.00 to 26.00
Cast iron borings	25.00 to 26.00
Low phos. forge crops	52.00 to 53.00
Low phos. punch'gs plate	47.00 to 48.00
Low phos. 3 ft and under	46.00 to 47.00
No. 1 RR. hvy. melting	46.00 to 48.00
Scrap rails, random lgth.	52.00 to 53.00
Rerolling rails	56.00 to 58.00
Rails 2 ft and under	56.00 to 57.00
Locomotive tires cut	52.00 to 53.00
Cut bolsters & side frames	50.00 to 51.00
Angles and splice bars	54.00 to 55.00
RR steel car axles	70.00 to 71.00
RR. couplers and knuckles	49.00 to 50.00
No. 1 machinery cast.	45.00 to 46.00
Cupola cast.	40.00 to 41.00
Heavy breakable cast.	38.00 to 39.00
Cast iron brake shoe	39.00 to 40.00
Cast iron wheels	47.00 to 48.00
Malleable	54.00 to 55.00
Stove plate	39.00 to 40.00
Steel car wheels	51.00 to 52.00

Philadelphia Area

No. 1 hvy. melting	$48.00 to $49.00
No. 2 hvy. melting	40.00 to 41.00
No. 1 dealer bundles	48.00 to 49.00
No. 2 bundles	38.00 to 39.00
No. 1 busheling	48.00 to 49.00
Machine shop turn.	32.00 to 33.00
Mixed bor. short turn.	35.00 to 36.00
Cast iron borings	33.00 to 34.00
Shoveling turnings	36.00 to 37.00
Clean cast chem. borings	39.00 to 40.00
Low phos. 5 ft and under	52.00 to 53.00
Low phos. 2 ft and under	53.00 to 54.00
Low phos. punch'gs	53.00 to 54.00
Elec. furnace bundles	49.00 to 50.00
Heavy turnings	41.00 to 42.00
RR. steel wheels	57.00 to 58.00
RR. spring steel	57.00 to 58.00
Rails 18 in. and under	65.00 to 66.00
Cupola cast.	40.00 to 41.00
Heavy breakable cast.	53.00 to 54.00
Cast iron car wheels	57.00 to 58.00
Malleable	61.00 to 62.00
Unstripped motor blocks	37.00 to 38.00
No. 1 machinery cast.	55.00 to 56.00

Cleveland

No. 1 hvy. melting	$41.00 to $42.00
No. 2 hvy. melting	35.00 to 36.00
No. 1 dealer bundles	41.00 to 42.00
No. 1 factory bundles	46.00 to 47.00
No. 2 bundles	34.00 to 35.00
No. 1 busheling	41.00 to 42.00
Machine shop turn.	24.00 to 25.00
Mixed bor. and turn.	27.50 to 28.50
Shoveling turnings	27.50 to 28.50
Cast iron borings	27.50 to 28.50
Cut struct'r'l & plates, 2 ft & under	45.00 to 46.00
Drop forge flashings	41.00 to 42.00
Low phos punch'gs, plate	42.00 to 43.00
Foundry steel, 2 ft & under	42.00 to 43.00
No. 1 RR heavy melting	44.00 to 45.00
Rails 2 ft and under	66.00 to 67.00
Rails 18 in. and under	67.00 to 68.00
Railroad grate bars	32.00 to 33.00
Steel axle turnings	30.00 to 31.00
Railroad cast.	53.00 to 54.00
No. 1 machinery cast.	51.00 to 52.00
Stove plate	48.00 to 49.00
Malleable	54.00 to 55.00

Youngstown

No. 1 hvy. melting	$45.00 to $46.00
No. 2 hvy. melting	39.00 to 40.00
No. 1 dealer bundles	45.00 to 46.00
No. 2 bundles	37.00 to 38.00
Machine shop turn.	22.00 to 23.00
Shoveling turnings	29.00 to 30.00
Cast iron borings	29.00 to 30.00
Low phos. plate	46.00 to 47.00

Buffalo

No. 1 hvy. melting	$40.00 to $41.00
No. 2 hvy. melting	35.00 to 36.00
No. 1 busheling	40.00 to 41.00
No. 1 dealer bundles	40.00 to 41.00
No. 2 bundles	32.00 to 33.00
Machine shop turn.	26.00 to 27.00
Mixed bor. and turn.	27.00 to 28.00
Shoveling turnings	31.00 to 32.00
Cast iron borings	27.00 to 28.00
Low phos. plate	44.00 to 45.00
Scrap rails, random lgth.	56.00 to 57.00
Rails 2 ft and under	60.00 to 61.00
RR. steel wheels	49.00 to 50.00
RR. spring steel	49.00 to 50.00
RR. couplers and knuckles	49.00 to 50.00
No. 1 machinery cast.	44.00 to 45.00
No. 1 cupola cast.	40.00 to 41.00

Detroit

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$37.50 to $38.50
No. 2 hvy. melting	29.00 to 30.00
No. 1 dealer bundles	38.50 to 39.50
No. 2 bundles	29.00 to 30.00
No. 1 busheling	37.50 to 38.50
Drop forge flashings	37.50 to 38.50
Machine shop turn.	20.00 to 21.00
Mixed bor. and turn.	23.00 to 24.00
Shoveling turnings	23.00 to 24.00
Cast iron borings	23.00 to 24.00
Low phos. punch'gs, plate	37.50 to 38.50
No. 1 cupola cast.	46.00 to 47.00
Heavy breakable cast.	42.00 to 43.00
Stove plate	43.00 to 44.00
Automotive cast.	52.00 to 53.00

St. Louis

No. 1 hvy. melting	$41.00 to $42.00
No. 2 hvy. melting	37.00 to 38.00
No. 1 dealer bundles	41.00 to 42.00
No. 2 bundles	32.00 to 33.00
Machine shop turn.	22.00 to 23.00
Cast iron borings	24.00 to 25.00
Shoveling turnings	24.00 to 25.00
No. 1 RR. hvy. melting	45.00 to 46.00
Rails, random lengths	48.00 to 49.00
Rails 18 in. and under	58.00 to 59.00
Locomotive tires uncut	50.00 to 51.00
Angles and splice bars	54.00 to 55.00
Std. steel car axles	67.00 to 68.00
RR. specialties	47.00 to 48.00
Cupola cast.	39.00 to 40.00
Heavy breakable cast.	35.00 to 36.00
Cast iron brake shoes	36.00 to 37.00
Stove plate	38.00 to 39.00
Cast iron car wheels	42.00 to 43.00
Rerolling rails	58.00 to 59.00
Unstripped motor blocks	35.00 to 36.00

Boston

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$36.00 to $37.00
No. 2 hvy. melting	29.00 to 30.00
No. 1 dealer bundles	36.00 to 37.00
No. 2 bundles	27.50 to 28.50
No. 1 busheling	36.00 to 37.00
Elec. furnace, 3 ft & under	38.00 to 39.00
Machine shop turn.	20.00 to 21.00
Mixed bor. and short turn.	23.00 to 24.00
Shoveling turnings	24.00 to 25.00
Clean cast. chem. borings	28.00 to 29.00
No. 1 machinery cast.	42.00 to 43.00
Mixed cupola cast.	34.00 to 35.00
Heavy breakable cast.	42.00 to 43.00
Stove plate	32.00 to 33.00
Unstripped motor blocks	26.00 to 27.00

New York

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$43.00 to $44.00
No. 2 hvy. melting	33.00 to 34.00
No. 2 dealer bundles	30.00 to 31.00
Machine shop turn.	23.00 to 24.00
Mixed bor. and turn.	24.00 to 25.00
Shoveling turnings	26.00 to 27.00
Clean cast chem. borings	30.00 to 31.00
No. 1 machinery cast.	43.00 to 44.00
Mixed yard cast.	38.00 to 39.00
Charging box cast.	43.00 to 44.00
Heavy breakable cast.	43.00 to 44.00
Unstripped motor blocks	30.00 to 31.00

Birmingham

No. 1 hvy. melting	$37.00 to $38.00
No. 2 hvy. melting	31.00 to 32.00
No. 1 dealer bundles	37.00 to 38.00
No. 2 bundles	26.00 to 27.00
No. 1 busheling	37.00 to 38.00
Machine shop turn.	27.00 to 28.00
Shoveling turnings	29.00 to 30.00
Cast iron borings	27.00 to 28.00
Electric furnace bundles	43.00 to 44.00
Elec. furnace, 3 ft & under	41.00 to 42.00
Bar crops and plate	45.00 to 46.00
Structural and plate, 2 ft.	44.00 to 45.00
No. 1 RR. hvy. melting	39.00 to 40.00
Scrap rails, random lgth.	48.00 to 49.00
Rails, 18 in. and under	55.00 to 56.00
Angles & splice bars	52.00 to 53.00
Rerolling rails	58.00 to 59.00
No. 1 cupola cast.	47.50 to 48.50
Stove plate	47.00 to 48.00
Charging box cast.	34.00 to 35.00
Cast iron car wheels	38.00 to 39.00
Unstripped motor blocks	38.00 to 39.00

Cincinnati

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$38.00 to $39.00
No. 2 hvy. melting	33.00 to 34.00
No. 1 dealer bundles	38.00 to 39.00
No. 2 bundles	30.00 to 31.00
Machine shop turn.	25.00 to 26.00
Mixed bor. and turn.	23.00 to 24.00
Shoveling turnings	28.00 to 29.00
Cast iron borings	23.00 to 24.00
Low phos. 18 in. & under	49.00 to 50.00
Rails, random lengths	54.00 to 55.00
Rails, 18 in. and under	64.00 to 65.00
No. 1 cupola cast.	43.00 to 44.00
Hvy. breakable cast.	40.00 to 41.00
Drop broken cast.	53.00 to 54.00

San Francisco

No. 1 hvy. melting	....	$48.00
No. 2 hvy. melting	....	43.00
No. 1 dealer bundles	....	47.00
No. 2 bundles	....	35.00
Machine shop turn.	....	32.00
Cast iron borings	....	32.00
No. 1 RR. hvy. melting	....	48.00
No. 1 cupola cast.	....	55.00

Los Angeles

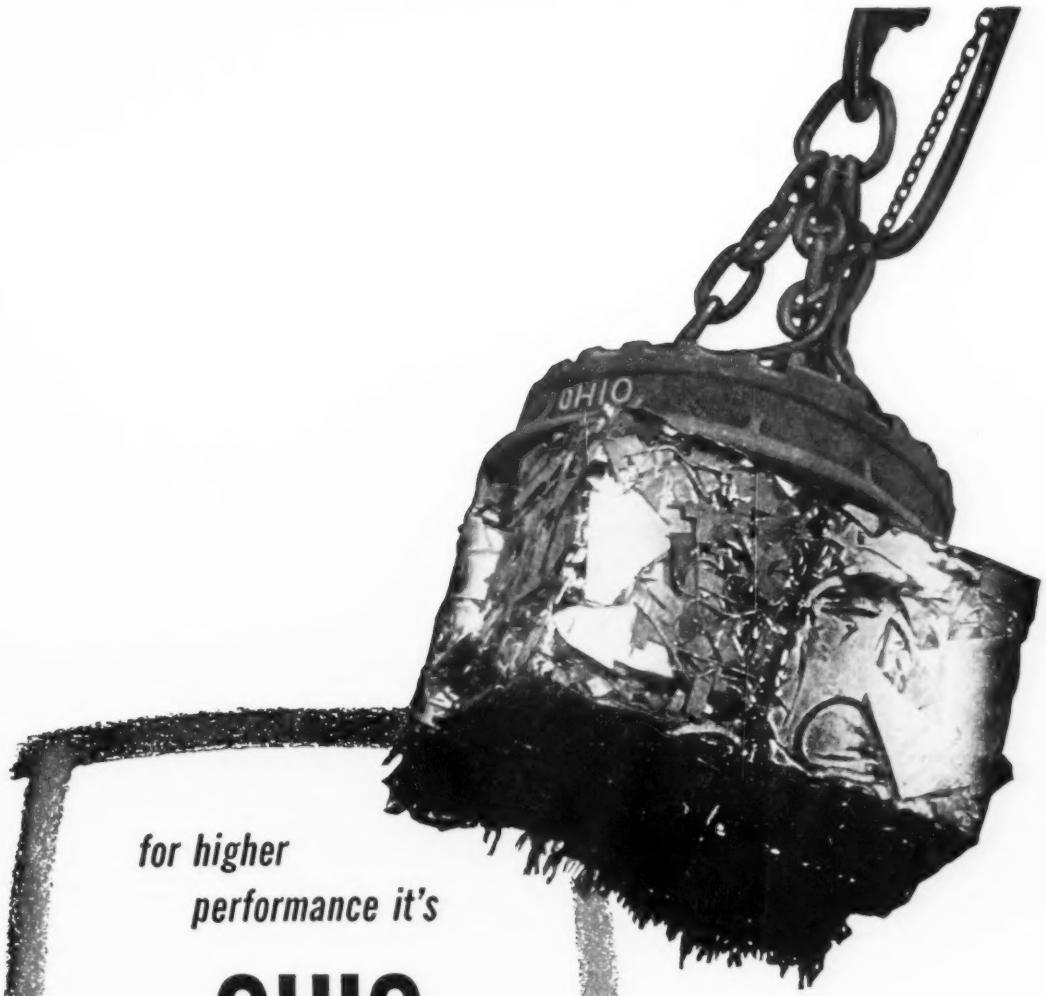
No. 1 hvy. melting	....	$46.00
No. 2 hvy. melting	....	43.00
No. 1 dealer bundles	....	45.00
No. 2 bundles	....	33.00
Machine shop turn.	....	32.00
Shoveling turnings	....	34.00
Cast iron borings	....	31.00
Elec. furn. 1 ft. and under (foundry)	....	57.00
No. 1 RR. hvy. melting	....	46.00
No. 1 cupola cast.	$52.00 to	53.00

Seattle

No. 1 hvy. melting	....	$48.00
No. 2 hvy. melting	....	42.00
No. 2 bundles	$28.00 to	30.00
No. 1 cupola cast.	....	47.00
Mixed yard cast.	....	47.00

Hamilton Ont.

No. 1 hvy. melting	....	$43.00
No. 2 hvy. melting	....	38.00
No. 1 dealer bundles	....	43.00
No. 2 bundles	....	32.00
Mixed steel scrap	....	40.00
Busheling	....	34.00
Bush., new fact., prep'd	....	43.00
Bush., new fact., unprep'd	....	37.00
Machine shop turn.	....	32.00
Short steel turn.	....	30.00
Mixed bor. and turn.	....	24.00
Rails, rerolling	....	54.00
Cast scrap	....	50.00



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U. S. Will Sell Its Magnesium Plant

Dow Chemical and the newly formed Velasco Magnesium bid for Velasco, Tex., plant.

Dow bid is high. But Justice Dept. must rule on the monopoly implications.

Zinc price drops to 12c per lb at E. St. Louis.

▪ The government-owned Dow Chemical Co. magnesium plant at Velasco, Tex., is up for grabs again. And this time it's almost certain to be sold.

Although the General Services Administration is handling the transaction, it is the Justice Dept. which will make the key decision on who gets the plant.

The Background — Here's the situation. In 1954 the Velasco plant was put up for sale by GSA. Dow was then, and is now running the plant for the government. Dow was the only bidder for the plant.

The Justice Dept. decided that to sell the plant to Dow would promote this company's monopoly of primary magnesium production. So, Dow's lease was extended another three years, to Jan. 31, 1958.

Dow Offers Most—Early this month GSA again put the Velasco plant on the block, with the aim of arranging for its sale before Dow's lease ran out. This time there were two bidders. Dow again offered to buy the plant, for $19.37 million—20 pct cash, the rest over 10 years at 5 pct interest.

A syndicate called Velasco Magnesium Corp., N. Y., offered GSA two bids: (1) $10 million—$2 million cash, and the balance in equal payments over 10 years, or (2) $16 million—$1 million cash, 4 million in equal payments over 10 years, and the balance based on production, but within the same 10 year period. The plant cost the U. S. $26.5 million.

GSA has 60 days in which to make up its mind. During this time the Defense and Justice Depts. will offer opinions.

The Defense Dept. is expected to request clauses which will guarantee the government magnesium in the case of emergency.

Competitive Angle—Those who believe Dow will get the nod say the entry into primary magnesium production of Alabama Metallurgical Corp., Selma, Ala., (IRON AGE, July 19, 1956) has altered the situation. Dow is no longer the only domestic producer of magnesium.

Those who think the newly-formed syndicate will be awarded the plant point out that Alabama Metallurgical is not yet in production, and won't be at least until 1958. Besides, they say, output of the southern company will only be 10,000 tons annually, compared with Dow's 78,000 tons.

If Velasco Wins—They say that if the syndicate bid is accepted, by early 1958 the industry would look like this: Dow Chemical—42,000 tons; Velasco Magnesium—36,000 tons; Alabama Metallurgical—10,000 tons. This, they insist, would promote competition, and be more acceptable to the Justice Dept.

The situation is complicated by the fact that although the government owns the plant, Dow owns the land on which it stands. However, this will probably not be a factor. Dow is expected to lease or sell if Velasco gets the bid.

Zinc

Zinc producers gave ground in the face of disappearing market supports. The price dropped 1½¢ per lb of zinc, on slab and alloys, effective May 6. Prime Western is now 12¢ per lb, f.o.b. East St. Louis.

The market was being held up by stockpile buying and the barter program. Suspension of barter and indications that the stockpile goal is almost reached weakened the market and brought down the price.

The lead price held at 15.8¢, f.o.b., St. Louis.

Barter Tools

The Dept. of Agriculture signed contracts in March for the delivery of $17.8 million worth of chrome metal, zinc and lead to the supple-

Monthly Average Metal Prices

(Cents per lb except as noted)

Average prices of the major nonferrous metals in April based on quotations appearing in THE IRON AGE, were as follows.

Electrolytic copper, del'd Conn. Valley	32.00
Copper, Lake	32.00
Straits Tin, New York	99.304
Zinc, E. St. Louis	13.50
Lead, St. Louis	15.80
Aluminum ingot, frt allow'd	27.10

Note: Quotations are going prices.

Primary Prices

(cents per lb)	Current price	last price	date of change
Aluminum ingot	27.10	25.90	8/10/56
Aluminum pig	25.00	24.00	8/10/56
Copper (E)	32.00	34.00	2/18/57
Copper (CS)	30.50	31.00	5/3/57
Copper (L)	32.00	34.00	2/19/57
Lead, St. L.	15.80	16.30	1/13/56
Lead, N. Y.	16.00	16.50	1/13/56
Magnesium ingot	36.00	34.50	8/13/56
Magnesium pig	35.25	33.75	8/13/56
Nickel	74.00	64.50	12/6/56
Titanium sponge	250-275	270-300	12/4/56
Zinc, E. St. L.	12.00	13.50	5/6/57
Zinc, N. Y.	12.50	14.00	5/6/57

ALUMINUM: 99% ingot frt allwd. COPPER: (E) = electrolytic, (CS) = custom smelters, electrolytic. (L) = lake. LEAD: common grade. MAGNESIUM: 99.8% pig. Velasco, Tex. NICKEL: Port Colbourne, Canada. ZINC: prime western. TIN: see right; other primary prices, pg. 174.

mental stockpile. This is in contrast with the $3.4 million total contracted for the previous month.

Both lead and zinc purchases were up. But the bulk of the increase was in chrome. After having spent a total of only $300,000 for chrome in the last one and a quarter years, Commodity Credit Corp. contracted for $11.3 million worth in March.

Lead contracts amounted to $4.4 million, up from $2.5 million signed in February 1957.

Zinc totals $2.1 million, up from $600,000 the previous month.

But total purchases by CCC of lead and zinc for the supplemental stockpile in the first quarter 1957 are down from the last quarter 1956:

	Lead	Zinc
1st quarter 1957	$7.9	$3.9
4th quarter 1956	$17.2	$9.9
3rd quarter 1956	$6.6	$31.6

(millions of dollars)

Copper

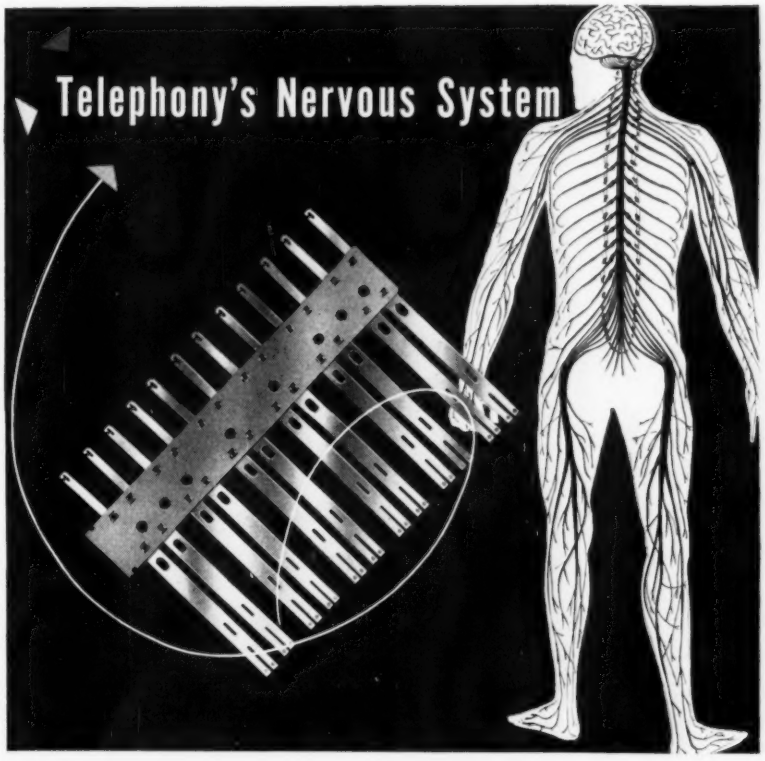
Kennecott Copper Corp. sold more copper in the first quarter of 1957 than in the corresponding period last year. But earnings are down.

Charles R. Cox, company president, told stockholders that Kennecott made $2.57 per share in the beginning period this year compared to $4.08 in the first quarter 1956. The reason, Mr. Cox pointed out, was that in 1956 copper price averaged 45¢ per lb. This year the average price per lb is 33¢, a difference of 12¢.

The Kennecott president also announced that the company plans to build a new electrolytic refinery at a cost of $20 million. It will be in the U. S., but Mr. Cox did not disclose further details.

Tin prices for the week: May 1—99.00; May 2—99.25; May 3—99.00; May 6—98.625; May 7—98.50.*

*Estimate



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Perhaps Seymour metallurgists can help solve your materials problems. Tell us your requirements.

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THE SEYMOUR MANUFACTURING COMPANY
2 FRANKLIN STREET
SEYMOUR, CONNECTICUT

MILL PRODUCTS

(Cents per lb, unless otherwise noted)

ALUMINUM

(Base 30,000 lb, f.o.b. ship. pt., frt. allowed)

Flat Sheet (Mill Finish) and Plate

("F" temper except 6061-0)

Alloy	.032	.081	.136-.249	.250-3.
1800, 1100, 3003	44.3	42.1	40.9	40.2
5052	51.8	46.8	45.1	42.9
6061-0	48.9	44.6	42.8	42.6

Extruded Solid Shapes

Factor	6063 T-5	6063 T-6
7.6-8	42.7-44.4	57.6-61.1
12-14	43.4-44.8	58.4-62.7
24-26	46.4-46.9	68.7-73.1
36-38	54.8-55.4	91.5-94.9

Screw Machine Stock—2011-T-3

Size*	¼	⅝-⅞	¼-1	1¼-1½
Price	59.7	58.8	57.4	55.3

Roofing Sheet, Corrugated

(Per sheet, 26" wide base, 16,000 lb)

Length"→	72	96	120	144
.019 gage	$1.352	$1.803	$2.254	$2.704
.024 gage	1.686	2.252	2.815	3.378

MAGNESIUM

(F.o.b. shipping Pt., carload frt. allowed)

Sheet and Plate

Type↓ Gage→	.250-3.00	.250-2.00	.188	.081	.032
AZ31B Stand. Grade	.....	67.9	69.0	77.9	103.1
AZ31B Spec.	.....	93.3	95.7	108.7	171.3
Tread Plate	.....	70.6	71.7	.....	.....
Tooling Plate	73.0	.....	.....	.....	.....

Extruded Shapes

factor→	8-8	12-14	24-26	36-38
Comm. Grade (AZ31C)	69.6	70.7	75.6	89.2
Spec. Grade (AZ31B)	84.6	85.7	90.6	104.2

Alloy Ingot

AZ91B (Die Casting) ..... 37.25 (delivered)
AZ63A, AZ92A, AZ91C (Sand Casting) 40.75 (Velasco, Tex.)

NICKEL, MONEL, INCONEL

(Base prices, f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	126	106	128
Strip, CR	124	108	138
Rod, bar, HR	107	89	109
Angles, HR	107	89	109
Plates, HR	120	105	121
Seamless tube	157	129	200
Shot, blocks	...	87	...

COPPER, BRASS, BRONZE

(Freight included on 5000 lbs)

	Sheet	Wire	Rod	Tube
Copper	54.13	.....	51.36	54.32
Brass, 70/30	47.52	48.06	47.46	50.43
Brass, Low	50.20	50.74	50.14	53.01
Brass, R L	51.14	51.68	51.08	53.95
Brass, Naval	51.69	.....	46.00	55.10
Munts Metal	49.79	.....	45.60	.....
Comm. Bs.	52.63	53.17	52.57	55.19
Mang. Bs.	55.43	.....	49.53	.....
Phos. Bs. 5%	73.17	.....	73.67	.....

Free Cutting Brass Rod $37.68

TITANIUM

(10,000 lb base, f.o.b. mill)

Sheet and strip, commercially pure, $11.00-$12.10; alloy, $14.75; Plate, HR, commercially pure, $9.25-$9.75; alloy, $11.25. Wire, rolled and/or drawn, commercially pure, $8.50-$9.00; alloy, $11.00; Bar, HR or forged, commercially pure, $7.10-$7.35; alloy, $7.10-$7.30; billets, HR, commercially pure, $6.85-$7.10; alloy, $6.85-$7.05.

PRIMARY METAL

(Cents per lb, unless otherwise noted)

Antimony, American, Laredo, Tex. 33.50
Beryllium aluminum 5% Be, Dollar per lb contained Be $74.75
Beryllium copper, per lb cont'd Be $43.00
Beryllium 97% lump or beads, f.o.b. Cleveland, Reading $71.50
Bismuth, ton lots ..... $ 2.25
Cadmium, del'd ..... $ 1.70
Calcium, 99.9%, small lots ..... $ 4.55
Chromium, 99.8% metallic basis ... $ 1.31
Cobalt, 97-99% (per lb) .... $2.00 to $2.07
Germanium, per gm, f.o.b. Miami, Okla., refined ..... $48.50-$53.50
Gold, U. S. Treas., per troy oz. $35.00
Indium, 99.9% dollars per troy oz... $ 2.25
Iridium, dollars per troy oz.... $90 to $100
Lithium, 98% ..... $11.00 to $14.00
Magnesium, sticks, 100 to 500 lb... 59.00
Mercury, dollars per 76-lb flask, f.o.b. New York ..... $255 to $257
Nickel oxide sinter at Copper Cliff, Ont., contained nickel 71.25
Palladium, dollars per troy oz... $23 to $24
Platinum, dollars per troy oz.... $92 to $95
Rhodium ..... $120.00 to $125.00
Silver ingots (¢ per troy oz.) 91.375
Thorium, per kg. $43.00
Uranium, normal per kg. $40.00
Vanadium ..... $ 3.45
Zirconium sponge $10.00

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5 ingot
No. 115 ..... 31.50
No. 120 ..... 30.00
No. 123 ..... 28.50
80-10-10 ingot
No. 305 ..... 35.50
No. 315 ..... 33.50
88-10-2 ingot
No. 210 ..... 43.25
No. 215 ..... 40.00
No. 245 ..... 35.50
Yellow ingot
No. 405 ..... 25.25
Manganese bronze
No. 421 ..... 28.50

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95-5 aluminum-silicon alloys
0.30 copper max. 24.00-25.25
0.60 copper max. 23.75-25.00
Piston alloys (No. 122 type) .. 23.00-25.00
No. 12 alum. (No. 2 grade) ... 21.00-22.50
108 alloy 21.50-22.50
195 alloy 23.75-25.50
13 alloy (0.60 copper max.) 23.75-25.00
AXS-679 ..... 21.50-22.50

Steel deoxidizing aluminum, notch bar granulated or shot
Grade 1—95-97½% 22.00-22.75
Grade 2—92-95% 21.00-21.50
Grade 3—90-92% 20.00-20.50
Grade 4—85-90% 18.75-19.50

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	28	27¼
Yellow brass	21⅞	20⅞
Red brass	25	24⅛
Comm. bronze	25⅛	25⅛
Mang. bronze	20½	19¾
Yellow brass rod ends	21¾	....

Customs Smelters Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire 26¼
No. 2 copper wire 24¾
Light copper 22¼
*Refinery brass 23¾
Copper bearing material 23¼
*Dry copper content.

Ingot Makers Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire 26¼
No. 2 copper wire 24¾
Light copper 22¼
No. 1 composition 23
No. 1 comp. turnings 22¾
Hvy. yellow brass solids..... 17
Brass pipe 19
Radiators 18

Aluminum

Mixed old cast ..... 14 —14½
Mixed new clips ..... 15½—16
Mixed turnings, dry ..... 14½—15

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Copper and Brass

No. 1 copper wire ..... 24 —24¼
No. 2 copper wire ..... 22½—23
Light copper ..... 20¾—21¼
Auto radiators (unsweated).. 15¾—16
No. 1 composition ..... 21 —21½
No. 1 composition turnings... 20½—21
Cocks and faucets ..... 16½—17
Clean heavy yellow brass.... 14½—15
Brass pipe ..... 17 —17½
New soft brass clippings .... 19 —19½
No. 1 brass rod turnings .... 16¼—16½

Aluminum

Alum. pistons and struts .... 5½— 6
Aluminum crankcases ..... 10½—11
1100 (2S) aluminum clippings 13½—14
Old sheet and utensils ..... 10½—11
Borings and turnings ..... 6½— 7
Industrial castings ..... 10½—11
2024 (24S) clippings ..... 12 —12½

Zinc

New zinc clippings ..... 6½— 7
Old zinc ..... 4½— 5
Zinc routings ..... 2½— 2¾
Old die cast scrap ..... 2¼— 2½

Nickel and Monel

Pure nickel clippings ..... $1.15-$1.35
Clean nickel turnings ..... $1.10-$1.15
Nickel anodes ..... $1.15-$1.35
Nickel rod ends ..... $1.15-$1.25
New Monel clippings 50-55
Clean Monel turnings 45-50
Old sheet Monel 50-55
Nickel silver clippings, mixed. 21
Nickel silver turnings, mixed. 18

Lead

Soft scrap lead ..... 12 —12½
Battery plates (dry) ..... 6½— 6¾
Batteries, acid free ..... 3¾— 4

Miscellaneous

Block tin ..... 75 —76
No. 1 pewter ..... 59 —60
Auto babbitt ..... 39 —40
Mixed common babbitt ..... 12 —12½
Solder joints ..... 17½—18
Siphon tops 42
Small foundry type ..... 14¼—14½
Monotype ..... 14 —14½
Lino. and stereotype ..... 13 —13½
Electrotype ..... 12½—12¾
Hand picked type shells ..... 9½—10
Lino. and stereo. dross ..... 4¾— 5
Electro. dross ..... 4 — 4¼

You can always get Bristol "on the wire"...

. . . the type of Brass wire you need, any time you need it. Bristol orders get delivered before most orders, elsewhere, get out of the paperwork stage . . . will be faster than ever with the new wire mill in operation. What's more, the metal is *right* when it gets there . . . both physically and dimensionally. And of course the same is true of Bristol Brass sheet, rod, and strip. So next time, get Bristol "on the wire" . . . just call Ludlow 2-3161.

and for BRASS FORGINGS, too . . . get them from . . .
ACCURATE BRASS CORPORATION
(Subsidiary of The Bristol Brass Corp.) now in a new and modern plant at Bristol, Conn.

THE BRISTOL BRASS CORPORATION
has been making Brass strip, rod and wire here in Bristol, Connecticut, since 1850, and has offices and warehouses in Boston, Buffalo, Chicago, Cleveland, Dayton, Detroit, Milwaukee, New York, Philadelphia, Pittsburgh, Rochester, Syracuse.

"Bristol-Fashion" means **Brass at its Best**

STEEL PRICES

(Effective May 7, 1957)

Italics identify producers listed in key at end of table. Base prices, f.o.b., mill in cents per lb., unless otherwise noted. Extras apply.

		BILLETS, BLOOMS, SLABS			PILING	SHAPES STRUCTURALS			STRIP					
		Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide-Flange	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot-rolled	Alloy Cold-rolled
EAST	Bethlehem, Pa.			$107.00 *B3*		5.05 *B3*	7.40 *B3*	5.05 *B3*						
	Buffalo, N. Y.	$74.00 *B3, R3*	$91.50 *B3, R3*	$107.00 *B3, R3*	5.90 *B3*	5.05 *B3*	7.40 *B3*	5.05 *B3*	4.675 *B3, R3*	6.85 *R7*	6.95 *B3*			
	Claymont, Del.													
	Harrison, N. J.													14.55 *C11*
	Conshohocken, Pa.		$96.50 *A2*	$114.00 *A2*					4.725 *A2*	6.90 *A2*	6.95 *A2*			
	New Bedford, Mass.									7.30 *R6*				
	Johnstown, Pa.	$74.00 *B3*	$91.50 *B3*	$107.00 *B3*		5.05 *B3*	7.40 *B3*							
	Boston, Mass.									7.40 *T8*				14.90 *T8*
	New Haven, Conn.									7.30 *D1*				
	Baltimore, Md.									6.85 *T8*				
	Phoenixville, Pa.					5.85 *P2*		5.85 *P2*						
	Sparrows Pt., Md.								4.675 *B3*		6.95 *B3*			
	Bridgeport, Wallingford, Conn.	$79.00 *N8*	$96.50 *N8*	$107.00 *N8*						7.30 *W1* 6.95 *N8*				
	Pawtucket, R. I. Worcester, Mass.									7.48 *A5,N7*				14.90 *N7*
MIDDLE WEST	Alton, Ill.								4.875 *L1*					
	Ashland, Ky.								4.675 *A7*					
	Canton-Massillon, Dover, Ohio		$94.00 *R3*	$107.00 *R3, T5*						6.85 *G4*		10.10 *G4*		14.55 *G4*
	Chicago, Ill. Franklin Park, Ill. Evanston, Ill.	$74.00 *U1, R3*	$91.50 *U1, R3,W8*	$107.00 *U1, R3,W8*	5.90 *U1*	5.00 *U1,W8* 5.00 *P13*	7.35 *U1,Y1* 6.00 *W8*	5.00 *U1*	4.675 *N4* 4.675 *A1*	6.95 *A1,T8* 6.95 *M8*			7.75 *W8, S9*	14.55 *A1, S9,T8*
	Cleveland, Ohio									6.85 *A5,J3*			7.75 *J3*	
	Detroit, Mich.			$107.00 *R5*					4.775 *G3, M2*	6.95 *M2,G3, D2,P11*	7.05 *G3*	10.10 *G3, D2*	7.75 *G3*	
	Anderson, Ind.									6.85 *G4*		10.10 *G4*		
	Duluth, Minn.													
	Gary, Ind. Harbor, Indiana	$74.00 *U1*	$91.50 *U1*	$107.00 *U1, Y1*	5.90 *I3*	5.00 *U1*	7.35 *U1,I3*	5.25 *I3*	4.675 *U1, I3,Y1*	6.85 *Y1*	6.95 *U1, I3,Y1*	10.20 *Y1*	7.75 *U1, Y1*	
	Sterling, Ill.	$74.00 *N4*				5.00 *N4*			4.775 *N4*					
	Indianapolis, Ind.									7.00 *C5*				
	Newport, Ky.												7.75 *A9*	
	Middletown, Ohio													
	Niles, Warren, Ohio Sharon, Pa.		$91.50 *S1, C10*	$107.00 *S1, C10*					4.675 *S1, R3*	6.85 *T4*	6.95 *S1, R3*	10.00 *S1, R3*	7.75 *S1*	14.55 *S1*
	Pittsburgh, Pa. Midland, Pa. Butler, Pa.	$74.00 *U1*	$91.50 *U1, C11*	$107.00 *U1, C11*	5.90 *U1*	5.00 *U1, J3*	7.35 *U1, J3*	5.00 *U1*	4.675 *P6*	5.750 *P6* 6.85 *J3,B4, S7*			7.75 *S9*	14.55 *S9*
	Portsmouth, Ohio													
	Weirton, Wheeling, Follansbee, W. Va.					5.00 *W3*			4.675 *W3*	6.85 *W3,F3*	6.95 *W3*	9.65 *W3*		
	Youngstown, Ohio	$74.00 *R3*	$91.50 *Y1, C10*	$107.00 *Y1*			7.35 *Y1*			6.85 *Y1,C5*	6.95 *U1, Y1*	10.20 *Y1*	7.75 *U1, Y1*	
WEST	Fontana, Cal.	$83.50 *K1*	$101.00 *K1*	$128.00 *K1*		5.75 *K1*	8.10 *K1*	5.90 *K1*	5.525 *K1*	8.70 *K1*				
	Geneva, Utah		$91.50 *C7*			5.00 *C7*	7.35 *C7*							
	Kansas City, Mo.					5.10 *S2*	7.45 *S2*		4.925 *S2*		7.20 *S2*			
	Los Angeles, Torrance, Cal.		$101.00 *B2*	$127.00 *B2*		5.70 *C7, B2*	8.05 *B2*		5.425 *B2, C7*	8.90 *C1*			8.95 *B2*	
	Minnequa, Colo.					5.30 *C6*			5.775 *C6*					
	Portland, Ore.					5.75 *O2*								
	San Francisco, Niles, Pittsburg, Cal.		$101.00 *B2*			5.65 *B2*	8.00 *B2*		5.425 *C7,B2*					
	Seattle, Wash.		$105.00 *B2*			5.75 *B2*	8.10 *B2*		5.675 *B2*					
SOUTH	Atlanta, Ga.					5.20 *A8*			4.875 *A8*					
	Fairfield, Ala. City, Birmingham, Ala.	$74.00 *T2*	$91.50 *T2*			5.00 *T2,R3* 5.00 *C16*	7.35 *T2*		4.675 *T2,R3* 4.975 *C10* 4.675 *C16*		6.95 *T2*			
	Houston, Lone Star, Texas	$80.00 *L3*	$96.50 *S2*	$112.00 *S2*		5.10 *S2*	7.45 *S2*		4.925 *S2*		7.20 *S2*			

STEEL PRICES

(Effective May 7, 1957)

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		SHEETS									WIRE ROD	TINPLATE†		BLACK PLATE
		Hot-rolled 18 ga. & hvyr.	Cold-rolled	Galvanized	Enameling	Long Terne	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.	Hot-rolled 19 ga.		Cokes* 1.25-lb. base box	Electro* 0.25-lb. base box	Holloware Enameling 29 ga.
EAST	Bethlehem, Pa.													
	Buffalo, N. Y.	4.675 *B3*	5.75 *B3*				6.90 *B3*	8.525 *B3*			5.80 *W6*	† Special coated mfg. terne deduct 50¢ from 1.25-lb. coke base box price. Can-making quality blackplate 55 to 128 lb. deduct $2.20 from 1.25-lb. coke base box. * COKES: 1.50-lb. add 25¢. ELECTRO: 0.50-lb. add 25¢; 0.75-lb. add 65¢; 1.00-lb. add $1.00. Differential 1.00 lb./0.25 lb. add 65¢.		
	Claymont, Del.													
	Coatesville, Pa.													
	Conshohocken, Pa.	4.725 *A2*	5.80 *A2*				6.95 *A2*							
	Harrisburg, Pa.													
	Hartford, Conn.													
	Johnstown, Pa.										5.80 *B3*			
	Fairless, Pa.	4.725 *U1*	5.80 *U1*				6.95 *U1*	8.575 *U1*				$10.15 *U1*	$8.85 *U1*	
	New Haven, Conn.													
	Phoenixville, Pa.													
	Sparrows Pt., Md.	4.675 *B3*	5.75 *B3*	6.30 *B3*			6.90 *B3*	8.575 *B3*	9.275 *B3*		5.90 *B3*	$10.15 *B3*	$8.85 *B3*	
	Worcester, Mass.										6.10 *A5*			
	Trenton, N. J.													
MIDDLE WEST	Alton, Ill.										6.00 *L1*			
	Ashland, Ky.	4.675 *A7*		6.30 *A7*	6.325 *A7*									
	Canton-Massillon, Dover, Ohio			6.30 *R3,R1*										
	Chicago, Joliet, Ill.	4.675 *W8, A1*					6.90 *U1*			5.80 *K2*	5.80 *A5,R3, N4,W8, K2*			
	Sterling, Ill.										5.90 *N4, K2*			
	Cleveland, Ohio	4.675 *J3, R3*	5.75 *J3, R3*		6.325 *R3*		6.90 *R3*	8.525 *R3, J3*			5.80 *A5*			
	Detroit, Mich.	4.775 *G3, M2*	5.85 *G3* 5.75 *M2*				7.00 *G2*	8.625 *G3*						
	Newport, Ky.	4.675 *A9*	5.75 *A9*											
	Gary, Ind. Harbor, Indiana	4.675 *U1, I3,Y1*	5.75 *U1, I3,Y1*	6.30 *U1, I3*	6.325 *U1, I3,Y1*	6.70 *U1*	6.90 *U1, Y1,I3*	8.525 *U1, Y1*			5.80 *Y1*	$10.05 *U1, Y1*	$8.75 *I3, U1,Y1*	7.50 *U1, Y1*
	Granite City, Ill.	4.875 *G2*	5.95 *G2*	6.50 *G2*	6.525 *G2*								$8.85 *G2*	7.60 *G2*
	Kokomo, Ind.			6.40 *C9*							5.90 *C9*			
	Mansfield, Ohio		5.75 *E2*			6.70 *E2*								
	Middletown, Ohio		5.75 *A7*	6.30 *A7*	6.325 *A7*	6.70 *A7*								
	Niles, Warren, Ohio Sharon, Pa.	4.675 *S1, R3,N3*	5.75 *R3*	6.30 *R3*	6.325 *N3*	6.70 *N3*	6.90 *S1, R3*	8.525 *S1, R3*					$8.75 *R3*	
	Pittsburgh, Pa. Midland, Pa. Butler, Pa.	4.675 *U1, J3,P6*	5.75 *U1, J3,P6*	6.30 *U1, J3*	6.325 *U1*		6.90 *U1, J3,R3*	8.525 *U1, J3*	9.275 *U1*		5.80 *A5, P6,J3*	$10.05 *J3, U1*	$8.75 *U1, J3*	7.50 *U1, J3*
	Portsmouth, Ohio	4.675 *P7*	5.75 *P7*								5.80 *P7*			
	Weirton, Wheeling, Follansbee, W. Va.	4.675 *W3, W5*	5.75 *W3, W5,F3*	6.30 *W3, W5*		6.70 *W3, W5*	6.90 *W3*	8.525 *W3*				$10.05 *W5, W3*	$8.75 *W5, W3*	7.50 *W5*
	Youngstown, Ohio	4.675 *U1, Y1*	5.75 *Y1*		6.325 *Y1*		6.90 *Y1*	8.525 *Y1*			5.80 *Y1*			
WEST	Fontana, Cal.	5.525 *K1*	7.00 *K1*				7.75 *K1*	9.775 *K1*				$10.80 *K1*	$9.50 *K1*	
	Geneva, Utah	4.775 *C7*												
	Kansas City, Mo.										6.05 *S2*			
	Los Angeles, Torrance, Cal.										6.60 *B2*			
	Minnequa, Colo.										6.05 *C6*			
	San Francisco, Niles, Pittsburg, Cal.	5.375 *C7*	6.70 *C7*	7.05 *C7*							6.60 *C7*	$10.80 *C7*	$9.50 *C7*	
	Seattle, Wash.													
SOUTH	Atlanta, Ga.													
	Fairfield, Ala. Alabama City, Ala.	4.675 *T2, R3*	.575 *T2*	6.30 *T2, R3*							5.80 *T2,R3*	$10.15 *T2*	$8.85 *T2*	
	Houston, Tex.										6.05 *S2*			

IRON AGE

STEEL PRICES

(Effective May 7, 1957)

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BARS						PLATES				WIRE
		Carbon† Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfr's. Bright
EAST	Bethlehem, Pa.				6.125 *B3*	8.325 *B3*	7.40 *B3*					
	Buffalo, N. Y.	5.075 *B3,R3*	5.075 *B3,R3*	6.90 *B5*	6.125 *B3,R3*	8.325 *B5,B3*	7.40 *B3*	4.85 *B3*				7.20 *W6*
	Claymont, Del.							5.70 *C4*		6.85 *C4*	7.55 *C4*	
	Coatesville, Pa.							5.25 *L4*		6.85 *L4*	7.55 *L4*	
	Conshohocken, Pa.							4.95 *A2*	5.925 *A2*	6.85 *A2*	7.25 *A2*	
	Harrisburg, Pa.							5.80 *P2*	6.275 *P2*			
	Hartford, Conn.			7.35 *R3*		8.625 *R3*	7.40 *B3*					
	Johnstown, Pa.	5.075 *B3*	5.075 *B3*		6.125 *B3*			4.85 *B3*		6.85 *B3*	7.25 *B3*	7.20 *B3*
	Fairless, Pa.	5.225 *U1*	5.225 *U1*		6.275 *U1*							
	Newark, N. J.			7.30 *W10*		8.50 *W10*						
	Camden, N. J.			7.30 *P10*		8.50 *P10*						
	Bridgeport, Conn. Putnam, Conn.	5.30 *N8*	5.30 *N8*	7.20 *N8* 7.40 *W10*	6.20 *N8*	8.475 *N8*	7.50 *N8*					
	Sparrows Pt., Md.		5.075 *B3*					4.85 *B3*		6.85 *B3*	6.85 *B3*	7.30 *B3*
	Palmer, Worcester, Readville, Mass. Milton, Mass.	5.225 *M7*	5.225 *M7*	7.40 *B5,C14*		8.625 *A5* 8.625 *B5*						7.50 *A5,W6* 9.025 *T8*
	Spring City, Pa.			7.30 *K4*		8.50 *K4*						
MIDDLE WEST	Alton, Ill.	5.275 *L1*										7.40 *L1*
	Ashland, Newport, Ky.							4.85 *A7,A9*		6.85 *A9*		
	Canton, Massillon, Ohio			6.85 *R3,R2*	6.125 *R3,T5*	8.325 *R3,R2, T5*						
	Chicago, Joliet, Ill.	5.075 *U1,R3, W8,N4* 5.075 *P13*	5.075 *U1,R3, N4* 5.075 *P13*	6.85 *A5,B5, W10,L2 W8,N9*	6.125 *U1,R3, W8*	8.325 *A5,B5, W8,L2,N9, W10*	5.875 *W8* 7.425 *U1*	4.85 *U1,I3, W8,A1*	5.925 *U1*	6.85 *U1,W8*	7.25 *U1*	7.20 *A5,K2 R3,N4,W7*
	Cleveland, Ohio	5.075 *R3*	5.075 *R3*	6.85 *A5,C13*		8.325 *A5,C13*	7.425 *R3*	4.95 *J3,R3*	5.925 *J3*		7.25 *J3,R3*	7.20 *A5, C13*
	Detroit, Mich.	5.175 *G3*	5.425 *G3*	7.05 *B5,P8* 7.10 *P3* 6.85 *R5*	6.225 *G3* 6.125 *R5*	8.525 *B5,P3, P8* 8.325 *R5*	7.525 *G3*	4.95 *G3*		6.90 *G3*		
	Duluth Minn.											7.20 *A5*
	Gary, Ind. Harbor, Crawfordsville	5.075 *U1,I3, Y1*	5.075 *U1,I3, Y1*	6.85 *R3,M5*	6.125 *U1,I3, Y1*	8.325 *R3,M4*	7.425 *U1,I3, Y1*	4.85 *U1,I3, Y1*	5.925 *I3*	6.85 *U1,Y1*	7.25 *U1,Y1*	7.30 *M4*
	Granite City, Ill.							5.05 *G2*				
	Kokomo, Ind.											7.30 *C9*
	Sterling, Ill.	5.175 *N4*	5.175 *N4*					4.85 *N4*				7.30 *K2*
	Niles, Warren, Ohio Sharon, Pa.			6.85 *C10*	6.125 *C10,S1*	8.325 *C10*	7.425 *S1*	4.85 *S1,R3*		6.85 *S1*	7.25 *S1,R3*	
	Pittsburgh, Pa. Midland, Pa.	5.075 *U1, C11,J3*	5.075 *U1,J3*	6.85 *A5,C8, J3,R3,S9, B4,W10,C11*	6.125 *U1, C11,J3*	8.325 *A5,R3, S9,C8,W10, C11*	7.425 *U1,J3*	4.85 *U1,J3*	5.925 *U1*	6.85 *U1,J3*	7.25 *U1,J3*	7.20 *A5,J3, P6*
	Portsmouth, Ohio											7.20 *P7*
	Weirton, Wheeling, Follansbee, W. Va.							4.85 *W5*				
	Youngstown, Ohio	5.075 *U1, Y1,R3*	5.075 *U1, Y1,R3*	6.85 *U1,Y1, F2*	6.125 *U1,Y1*	8.325 *Y1,F2*	7.425 *U1,Y1*	4.85 *U1,Y1, R3*		6.85 *Y1*	7.25 *Y1* 7.25 *U1*	7.20 *Y1*
WEST	Emeryville, Cal.	5.825 *J5*	5.825 *J5*									
	Fontana, Cal.	5.775 *K1*	5.775 *K1*		7.175 *K1*		8.125 *K1*	5.60 *K1*		7.60 *K1*	8.00 *K1*	
	Geneva, Utah							4.85 *C7*			7.25 *C7*	
	Kansas City, Mo.	5.325 *S2*	5.325 *S2*		6.375 *S2*		7.675 *S2*					7.45 *S2*
	Los Angeles, Torrance, Cal.	5.775 *C7,B2*	5.775 *C7,B2*	8.30 *R3,P14*	7.175 *B2*	10.20 *P14*	8.125 *B2*					8.15 *B2*
	Minnequa, Colo.	5.525 *C6*	5.525 *C6*					5.70 *C6*				7.45 *C6*
	Portland, Ore.	5.825 *O2*	5.825 *O2*									
	San Francisco, Niles, Pittsburg, Cal.	5.775 *C7* 5.825 *B2* 6.025 *P9*	5.775 *C7* 5.825 *B2* 6.025 *P9*				8.175 *B2*					8.15 *C7,C6*
	Seattle, Wash.	5.825 *B2, N6*	5.825 *B2*				8.175 *B2*	5.75 *B2*		7.75 *B2*	8.15 *B2*	
SOUTH	Atlanta, Ga.	5.275 *A8*	5.275 *A8*									7.40 *A8*
	Fairfield, Ala. City, Birmingham, Ala.	5.075 *T2,R3* 5.075 *C16*	5.075 *T2,R3* 5.075 *C16*	7.45 *C16*			7.425 *T2*	4.85 *T2,R3*			7.25 *T2*	7.20 *T2,R3*
	Houston, Ft. Worth, Lone Star, Tex.	5.325 *S2*	5.325 *S2*		6.375 *S2*		7.675 *S2*	4.95 *S2* 5.20 *L3*		6.95 *S2*	7.35 *S2*	7.45 *S2*

† Merchant Quality—Specialty Quality .35¢ higher.

STEEL PRICES *(Effective May 7, 1957)*

Key to Steel Producers

With Principal Offices

A1 Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angel Nail & Chaplet Co., Cleveland.
A7 Armco Steel Corp., Middletown, Ohio
A8 Atlantic Steel Co., Atlanta, Ga.
A9 Acme-Newport Steel Co., Newport, Ky.

B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2 Bethlehem Pacific Coast Steel Corp., San Francisco
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin, Inc., Harvey, Ill.
B6 Brook Plant, Wickwire Spencer Steel Div., Birdsboro, Pa.

C1 Calstrip Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C3 Central Iron & Steel Co., Harrisburg, Pa.
C4 Claymont Products Dept., Claymont, Del.
C5 Cold Metals Products Co., Youngstown, O.
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia Geneva Steel Div., San Francisco
C8 Columbia Steel & Shafting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Pittsburgh, Pa.
C11 Crucible Steel Co. of America, Pittsburgh
C12 Cumberland Steel Co., Cumberland, Md.
C13 Cuyahoga Steel & Wire Co., Cleveland
C14 Compressed Steel Shafting Co., Readville, Mass.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Div., Birmingham
C17 Chester Blast Furnace, Inc., Chester, Pa.

D1 Detroit Steel Corp., Detroit
D2 Dearborn Div., Sharon Steel Corp.
D3 Driver Harris Co., Harrison, N. J.
D4 Dickson Weatherproof Nail Co., Evanston, Ill.

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire Steel Co., Mansfield, O.

F1 Firth Sterling, Inc., McKeesport, Pa.
F2 Fitzsimons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.
G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit
G4 Greer Steel Co., Dover, O.
H1 Hanna Furnace Corp., Detroit
I2 Ingersoll Steel Div., Chicago
I3 Inland Steel Co., Chicago
I4 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Cal.
K2 Keystone Steel & Wire Co., Peoria
K3 Koppers Co., Granite City, Ill.
K4 Keystone Drawn Steel Co., Spring City, Pa.

L1 Laclede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O.
M2 McLouth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid States Steel & Wire Co., Crawfordsville, Ind.
M5 Monarch Steel Div., Hammond, Ind.
M6 Mystic Iron Works, Everett, Mass.
M7 Milton Steel Products Div., Milton, Pa.
M8 Mill Strip Products Co., Evanston, Ill.

N1 National Supply Co., Pittsburgh
N2 National Tube Div., Pittsburgh
N3 Niles Rolling Mill Div., Niles, O.
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N6 Northwest Steel Rolling Mills, Seattle
N7 Newman Crosby Steel Co., Pawtucket, R. I.
N8 Northeastern Steel Corp., Bridgeport, Conn.
N9 Nelson Steel & Wire Co.

O1 Oliver Iron & Steel Co., Pittsburgh
O2 Oregon Steel Mills, Portland

P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Iron & Steel Co., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P5 Pittsburgh Screw & Bolt Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit
P8 Plymouth Stee lCo., Detroit
P9 Pacific States Steel Co., Niles, Cal.
P10 Precision Drawn Steel Co., Camden, N. J.
P11 Production Steel Strip Corp., Detroit
P13 Phoenix Mfg. Co., Joliet, Ill.
P14 Pacific Tube Co.

R1 Reeves Steel & Mfg. Co., Dover, O.
R2 Reliance Div., Eaton Mfg. Co., Massillon, O.
R3 Republic Steel Corp., Cleveland
R4 Roebling Sons Co., John A., Trenton, N. J.
R5 Rotary Electric Steel Co., Detroit
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon, Pa.
S2 Sheffield Steel Div., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw and Steel Co., Fitchburg, Mass.
S5 Sweet's Steel Co., Williamsport, Pa.
S6 Standard Forging Corp., Chicago
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Steel Corp., Carnegie, Pa.
S10 Seneca Steel Service, Buffalo

T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessee Coal & Iron Div., Fairfield
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Strip Div., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T7 Texas Steel Co., Fort Worth
T8 Thompson Wire Co., Boston

U1 United States Steel Corp., Pittsburgh
U2 Universal-Cyclops Steel Corp., Bridgeville, Pa.
U3 Ulbrich Stainless Steels, Wallingford, Conn.
U4 U. S. Pipe & Foundry Co., Birmingham

W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Div., Buffalo
W7 Wilson Steel & Wire Co., Chicago
W8 Wisconsin Steel Div., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wyckoff Steel Co., Pittsburgh
W12 Wallace Barnes Steel Div., Bristol, Conn.
Y1 Youngstown Sheet & Tube Co., Youngstown, O.

PIPE AND TUBING — **Base discounts (pct) f.o.b. mills. Base price about $200 per net ton.**

	BUTTWELD														SEAMLESS							
	½ In.		¾ In.		1 In.		1¼ In.		1½ In.		2 In		2½-3 In.		2 In.		2½ In.		3 In.		3½-4 In.	
STANDARD T. & C.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
Sparrows Pt. *B3*	7.25	+8.00	10.25	+4.00	13.75	0.50	16.25	1.25	16.75	2.25	17.25	2.75	18.75	2.50								
Youngstown *R3*	9.25	+10.00	12.25	+6.00	15.75	+1.50	18.25	0.25	18.75	1.25	19.25	1.75	20.75	2.50								
Fontana *K1*	+3.75	+19.00	+0.75	+15.00	2.75	+10.50	5.25	+9.75	5.75	+8.75	6.25	+8.25	7.75	+8.50								
Pittsburgh *J3*	9.25	+6.00	12.25	+2.00	15.75	2.50	18.25	3.25	18.75	4.25	19.25	4.75	20.75	5.25	5.25	+20.25	1.25	+16.50	3.75	+13.00	5.25	+11.50
Alton, Ill. *L1*	7.25	+8.00	10.25	+4.00	13.75	0.50	16.25	1.25	16.75	2.25	17.25	2.75	18.75	2.50								
Sharon *M3*	9.25	+10.00	12.25	+2.00	15.75	+1.50	18.25	0.25	18.75	1.25	19.25	1.75	20.75	2.50								
Fairless *N2*	7.25	+8.00	10.25	+4.00	13.75	0.50	16.25	1.25	16.75	2.25	17.25	2.75	18.75	2.50								
Pittsburgh *N1*	9.25	+6.00	12.25	+2.00	15.75	2.50	18.25	3.25	18.75	4.25	19.25	4.75	20.75	5.25	5.25	+20.25	1.25	+16.50	3.75	+13.00	5.25	+11.50
Wheeling *W5*	9.25	+6.00	12.25	+2.00	15.75	2.50	18.25	3.25	18.75	4.25	19.25	4.75	20.75	5.25								
Wheatland *W4*	9.25	+6.00	12.25	+2.00	15.75	2.50	18.25	3.25	18.75	4.25	19.25	4.75	20.75	5.25								
Youngstown *Y1*	9.25	+6.00	12.25	+2.00	15.75	2.50	18.25	3.25	18.75	4.25	19.25	4.75	20.75	5.25	5.25	+20.25	1.25	+16.50	3.75	+13.00	5.25	+11.50
Indiana Harbor *Y1*	8.25	+9.00	13.25	+2.00	14.75	1.50	17.25	2.25	17.75	3.25	18.25	3.75	19.75	4.25								
Lorain *N2*	9.25	+6.00	12.25	+2.00	15.75	2.50	18.25	3.25	18.75	4.25	19.25	4.75	20.75	5.25	5.25	+20.25	1.25	+16.50	3.75	+13.00	5.25	+11.50
EXTRA STRONG PLAIN ENDS																						
Sparrows Pt. *B3*	11.75	+2.00	15.75	2.00	18.75	6.50	19.25	5.25	19.75	6.25	20.25	6.75	20.75	5.50								
Youngstown *R3*	13.75	+4.00	17.75	list	20.75	4.50	21.25	4.25	21.75	5.25	22.25	5.75	22.75	5.50								
Fairless *N2*	11.75	+2.00	15.75	2.00	18.75	6.50	19.25	5.25	19.75	6.25	20.25	6.75	20.75	5.50								
Fontana *K1*	0.75		4.75		7.75		8.25		8.75		9.25		9.75									
Pittsburgh *J3*	13.75	+2.00	17.75	4.00	20.75	8.50	21.25	7.25	21.75	8.25	22.25	8.75	22.75	7.50	3.75	+17.75	3.75	+12.00	6.25	+10.50	11.25	+5.50
Alton, Ill. *L1*	11.75	+2.00	15.75	2.00	18.75	6.50	19.25	5.25	19.75	6.25	20.25	6.75	20.75	5.50								
Sharon *M3*	13.75	+4.00	17.75	list	20.75	4.50	21.25	4.25	21.75	5.25	22.25	5.75	22.75	5.50								
Pittsburgh *N1*	13.75	+2.00	17.75	4.00	20.75	8.50	21.25	7.25	21.75	8.25	22.25	8.75	22.75	7.50	3.75	+17.75	3.75	+12.00	6.25	+10.50	11.25	+5.50
Wheeling *W5*	13.75	+2.00	17.75	4.00	20.75	8.50	21.25	7.25	21.75	8.25	22.25	8.75	22.75	7.50								
Wheatland *W4*	13.75	+2.00	17.75	4.00	20.75	8.50	21.25	7.25	21.75	8.25	22.25	8.75	22.75	7.50								
Youngstown *Y1*	13.75	+2.00	17.75	4.00	20.75	8.50	21.25	7.25	21.75	8.25	22.25	8.75	22.75	7.50	3.75	+17.75	3.75	+12.00	6.25	+10.50	11.25	+5.50
Indiana Harbor *Y1*	12.75	+1.00	16.75	3.00	19.75	7.50	20.25	6.25	20.75	7.25	21.25	7.75	21.75	6.50								
Lorain *N2*	13.75	+2.00	17.75	4.00	20.75	8.50	21.25	7.25	21.75	8.25	22.25	8.75	22.75	7.50	3.75	+17.75	3.75	+12.00	6.25	+10.50	11.25	+5.50

Threads only, buttweld and seamless 2¼ pt. higher discount. Plain ends, buttweld and seamless, 3-in. and under, 5½ pt. higher discount.
Galvanized discounts based on zinc price range of over 9¢ to 11¢ per lb. East St. Louis. For each 2¢ change in zinc, discounts vary as follows: ½, ¾ and 1-in., 2 pt.; 1¼, 1½ and 2-in. 1½ pt.; 2½ and 3-in., 1 pt., e.g., zinc price range of over 13¢ to 15¢ would lower discounts on 2½ and 3-in. pipe by 2 points; zinc price in range over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 12¢ per lb.

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	per lb	SAE
18	4	1	—	—	$1.68	T-1
18	4	1	—	5	2.385	T-4
18	4	2	—	—	1.185	T-2
1.5	4	1.5	8	—	1.04	M-1
6	4	3	6	—	1.43	M-3
6	4	2	5	—	1.185	M-2

High-carbon chromium .. .83 D-3, D-5
Oil hardened manganese .45 O-2
Special carbon .41 W-1
Extra carbon .345 W-1
Regular carbon .29 W-1

Warehouse prices on and east of Mississippi are 4¢ per lb higher. West of Mississippi, 6¢ higher.

CLAD STEEL

Base prices, cents per lb f.o.b

	Cladding	Plate (A3, J2, L4) 10 pct	Plate (A3, J2, L4) 15 pct	Plate (A3, J2, L4) 20 pct	Sheet (I2) 20 pct
Stainless Type	302	....	....	....	35.50
	304	34.60	38.00	41.50	37.75
	316	39.70	43.20	46.65	55.50
	321	36.35	39.80	43.50	44.75
	347	39.50	43.95	48.45	54.25
	405	29.20	33.15	37.05	....
	410, 430	28.70	32.65	36.55	....

CR Strip (S9) Copper, 10 pct, 2 sides, 39.85. 1 side, 33.00.

ELECTRICAL SHEETS

22-Gage F.o.b. Mill Cents Per Lb	Hot-Rolled (Cut Lengths)*	Cold-Reduced (Coiled or Cut Length) Semi-Processed	Cold-Reduced (Coiled or Cut Length) Fully Processed
Field	9.00	9.20	....
Armature	10.35	10.35	10.85
Elect.	11.00	11.025	11.525
Motor	12.05	12.075	12.575
Dynamo	13.05	13.05	13.55
Trans. 72	14.05	14.05	14.55
Trans. 65	14.60	Grain Oriented	
Trans. 58	15.10	Trans. 80	18.50
Trans. 52	16.15	Trans. 73	19.00

Producing points: Beech Bottom (W5); Brackenridge (A3); Granite City (G2); Indiana Harbor (I3); Mansfield (E2); Newport, Ky. (N5); Niles, O. (N3); Vandergrift (U1); Warren, O. (R3) (20¢ higher, HR); Zanesville, Butler (A7).

LAKE SUPERIOR ORES

51.50% Fe natural content, delivered lower Lake ports. Prices for 1957 season. Freight charges for seller's account.

	Gross Ton
Openhearth lump	$12.70
Old range, bessemer	11.85
Old range, nonbessemer	11.70
Mesabi, bessemer	11.60
Mesabi, nonbessemer	11.45
High phosphorus	11.45

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard Q Coated Nails Col	Woven Wire Fence Col	"T" Fence Posts Col	Single Loop Bale Ties Col	Galv. Barbed and Twisted Barbless Wire Col	Merch. Wire Annld ¢/lb.	Merch. Wire Galv. ¢/lb.
Alabama City R3	167	181	195	187		8.10	8.50
Aliquippa, Pa. J3***	164	179	....	181		8.20	8.875
Atlanta A8**	166	182	192	190		8.05	8.65
Bartonville K2**	166	182	198	190		8.30	9.06
Buffalo W6	....	....	....	....		8.20	8.75
Chicago, Ill. N4**	164	180	167	196	188	8.35	9.10
Cleveland A6	173	....	....	....	....	8.20	8.75
Cleveland A5	....	....	....	....	....	8.20	....
Crawfordsville M4**	166	182	198	190		8.30	9.05
Donora, Pa. A5	164	176	196	184		8.20	8.75
Duluth A5	164	176	167	196	184	8.20	8.75
Fairfield, Ala. T2	164	176	196	184		8.20	8.75
Galveston D4	169‡	....	....	....	....	....	....
Houston S2	169	181	195	189		8.45	9.00
Johnstown, Pa. B3**	164	180	167	188		8.20	8.95
Joliet, Ill. A5	164	176	196	184		8.20	8.75
Kokomo, Ind. C9*	166	178	198	186		8.30	8.85
Los Angeles B2**	....	....	....	....		9.15	9.90
Kansas City S2*	169	181	195	189		8.45	9.00
Minnequa C6†	169	181	172	201	189	8.45	9.00
Monessen P6	167	185	....	....	191	8.10	8.10
Palmer, Mass. W6	....	....	....	....	....	8.50	9.05
Pittsburg, Cal. C7	183	199	220	204	9.15	9.70	
Rankin, Pa. A5	164	176	....	....	184	8.20	8.75
So. Chicago R3	167	181	195	187	8.10	8.50	
S. San Francisco C6†	....	....	220	....	9.15	9.70	
Sparrows Pt. B3**	166	....	198	190	8.30	9.05	
Struthers, O. Y1*	....	....	....	....	8.20	8.85	
Worcester A5	178	....	....	....	8.50	9.05	
Williamsport, Pa. S5	....	....	175	....	....	....	....

* Zinc less than .10¢. † Plus zinc extras.
** 13.5 zinc. ‡ Wholesalers only.
*** 10¢ zinc.

WAREHOUSES

Metropolitan Price, dollars per 100 lb.

Cities	City Delivery‡ Charge	Sheets: Hot-Rolled (18 ga. & hvr.)	Sheets: Cold-Rolled (15 gage)	Sheets: Galvanized (10 gage)††	Strip: Hot-Rolled	Plates	Shapes: Standard Structural	Bars: Hot-Rolled (merchant)	Bars: Hot-Rolled (special quality)	Bars: Cold-Finished	Alloy Bars: Hot-Rolled 4615 As rolled	Alloy Bars: Hot-Rolled 4140 Annealed	Alloy Bars: Cold-Drawn 4615 As rolled	Alloy Bars: Cold-Drawn 4140 Annealed
Atlanta		8.17	9.37	9.83	8.21	8.55	8.59	8.45	....	10.23	....	....	....	....
Baltimore	$.10	7.98	9.08	9.31	8.46	8.36	8.85	8.53	....	9.13	14.99	14.44	18.39	18.09
Birmingham	.15	7.80	9.00	9.52	7.82	8.16	8.20	8.07	8.44	10.04-10.12	....	....	....	....
Boston	.10	8.94	9.98	11.16	8.99	9.28	9.20	9.17	9.57	....	15.79	14.79	19.14	18.39
Buffalo	.15	8.00	9.15	10.90	8.20	8.65	8.65	8.40	8.85	8.85	15.65	14.65	19.01	18.25
Chicago	.15	7.95	9.15	9.85	7.97	8.31	8.35	8.22	8.50	8.50	15.30	14.30	18.65	17.90
Cincinnati	.15	8.09	9.20	9.90	8.29	8.67	8.89	8.53†	8.87	8.99	15.61	14.61	18.96	18.21
Cleveland	.15	7.93	9.13	9.75	8.07	8.54	8.72	8.31	8.67	8.75	15.39	14.39	18.74	17.99
Denver		9.70	11.30	12.49	9.80	9.70	9.80	9.95	....	10.65	....	....	....	17.60
Detroit	.15	8.18	9.40	10.20	8.32	8.66	8.89	8.52	8.86	8.85	15.46	14.56	18.81	18.16
Houston		8.80	9.75	....	8.85	8.80	9.10	9.15	....	10.65	15.50	....	19.30	19.05
Kansas City	.20	8.52	9.72	10.07	8.60	8.83	8.87	8.73	....	9.42	15.32	14.77	18.72	18.42
Los Angeles	.10	9.20	10.90	11.35	9.25	9.75	9.25	9.10	9.30	12.20	16.45	15.60	20.30	19.70
Memphis	.15	8.02	9.22	....	8.12	8.35	8.39	8.25	....	9.85	....	....	....	....
Milwaukee	.15	8.08	9.28	9.98	8.10	8.44	8.56	8.35	8.71	8.72	15.43	14.43	18.78	18.03
New York	.10	8.55	9.76	10.33	9.00	9.11	9.01	9.11	9.48	....	15.02	14.69	18.42	18.29
Norfolk	.20	8.00	....	....	8.40	8.35	8.70	8.45	....	10.70	....	....	....	....
Philadelphia	.10	8.25	9.17	10.39	8.92	8.78	8.80	8.81	9.18	9.41	15.61	14.61	18.96	18.21
Pittsburgh	.15	7.93	9.14	10.20	8.07	8.31	8.35	8.22	8.59	8.75	15.30	14.30	18.65	17.90
Portland		9.20	11.20	11.60	11.05	9.00	9.35	9.35	....	13.80	16.70	16.10	20.40	20.25
San Francisco	.10	9.05	10.40	10.90	9.05	9.30	9.15	9.15	9.90	12.40	16.45	15.60	20.30	19.70
Seattle		9.55	10.70	11.65	9.55	9.30	9.35	9.50	9.85	13.40	16.55	15.85	19.50	19.45
Spokane	.15	9.70	10.85	11.80	9.70	9.45	9.50	9.65	10.00	13.55	....	16.75	....	20.35
St. Louis	.15	8.29	9.49	10.21	8.34	8.67	8.82	8.58	9.11	9.11	15.66	14.66	19.01	18.26
St. Paul	.15	8.39	9.59	10.31	8.43	8.90	8.94	8.53	....	9.21	....	14.62	....	18.27

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 4999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may not be combined with each other or with galvanized sheets for quantity.
† 16 gage. †† 13½¢ zinc. ‡ Deduct for country delivery.

C-R SPRING STEEL

Cents Per Lb F.o.b. Mill	CARBON CONTENT 0.26-0.40	0.41-0.60	0.61-0.80	0.81-1.05	1.06-1.35
Baltimore, Md. T8	9.20	10.40	12.60	15.60	18.55
Bristol, Conn. W12	....	10.40	12.60	15.60	18.55
Boston T8	9.20	10.40	12.60	15.60	18.55
Buffalo, N. Y. R7	8.65	10.10	12.30	15.30	18.25
Carnegie, Pa. S9	8.65	10.10	12.30	15.30	....
Cleveland A5	8.65	10.10	12.30	15.30	18.25
Detroit D1	8.75	10.20	12.40	15.40	....
Detroit D2	8.75	10.20	12.40	....	....
Dover, O. G4	8.65	10.10	12.30	15.30	18.25
Evanston, Ill. M8	8.65	10.10	12.30	....	....
Franklin Park, Ill. T8	8.75	10.10	12.30	15.30	18.25
Harrison, N. J. C11	....	....	12.60	15.60	18.55
Indianapolis C5	8.80	10.25	12.30	15.30	18.25
Los Angeles	10.85	12.30	14.50	....	....
New Castle, Pa. B4	8.65	10.10	12.30	15.30	....
New Haven, Conn. D1	9.10	10.40	12.60	15.60	....
Pawtucket, R. I. N7	9.20	10.40	12.60	15.60	18.55
Pittsburgh S7	8.65	10.10	12.30	15.30	18.25
Riverdale, Ill. A1	8.75	10.10	12.30	15.30	18.25
Sharon, Pa. S1	8.65	10.10	12.30	15.30	18.25
Trenton R4	11.05	10.40	12.60	15.60	18.55
Wallingford W1	9.10	10.40	12.60	15.60	18.45
Warren, Ohio T4	8.65	10.10	12.30	15.30	18.25
Worcester, Mass. A5	9.20	10.40	12.60	15.60	18.55
Youngstown C5	8.65	10.10	12.30	15.30	18.25

BOILER TUBES

$ per 100 ft. carload lots, cut 10 to 24 ft. F.o.b. Mill	Size OD-In.	Size B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.	Elec. Weld C.D.
Babcock & Wilcox	2	13	36.34	42.56	33.21	....
	2½	12	48.94	57.31	44.73	....
	3	12	56.51	66.18	51.66	....
	3½	11	65.97	77.25	60.30	....
	4	10	87.61	102.59	80.07	....
National Tube	2	13	36.34	42.56	33.21	....
	2½	12	48.94	57.31	44.73	....
	3	12	56.51	66.18	51.66	....
	3½	11	65.97	77.25	60.30	....
	4	10	87.61	102.59	80.07	....
Pittsburgh Steel	2	13	36.34	42.56	....	....
	2½	12	48.94	57.31	....	....
	3	12	56.51	66.18	....	....
	3½	11	65.97	77.25	....	....
	4	10	87.61	102.59	....	....

(Effective May 7, 1957)

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Screw Spikes	Tie Plates	Track Bolts Untreated
Bessemer *U1*	5.275	6.25	6.60				
Cleveland							13.85
So. Chicago *R3*				9.225			
Easley *T2*	5.275	6.25					
Fairfield *T2*		6.25		9.225		6.275	
Gary *U1*	5.275					6.275	
Huntington *C16*		6.25					
Ind. Harbor *I3*	5.275		6.60	9.225		6.275	
Ind. Harbor *Y1*				9.225			
Johnstown *B3*		6.25					
Joliet *U1*			6.60				
Kansas City *S2*				9.225			13.85
Lackawanna *B3*	5.275	6.25	6.60			6.275	
Lebanon *B3*							13.85
Minnequa *C6*	5.275	6.75	6.60	9.225		6.275	13.85
Pittsburgh *P5*							13.85
Pittsburgh *J3*				9.225			
Seattle *B2*				9.725		6.425	13.85
Steelton *B3*	5.275		6.60			6.275	13.85
Struthers *Y1*				9.225			
Torrance *C7*						6.425	
Williamsport *S5*		6.15					
Youngstown *R3*				9.225			

COKE

Furnace, beehive (f.o.b. oven) Net-Ton
Connellsville, Pa. ..... $15.00 to $15.75
Foundry, beehive (f.o.b. oven)
$17.50 to $19.00

Foundry oven coke
Buffalo, del'd $31.75
Detroit, f.o.b. 30.50
New England, del'd 31.55
Kearney, N. J., f.o.b. 29.75
Philadelphia, f.o.b. 29.50
Swedeland, Pa., f.o.b. 29.50
Painesville, Ohio, f.o.b. 30.50
Erie, Pa., f.o.b. 30.50
Cleveland, del'd 32.65
Cincinnati, del'd 31.84
St. Paul, f.o.b. 29.75
St. Louis, f.o.b. 31.50
Birmingham, f.o.b. 28.85
Milwaukee, f.o.b. 30.50
Neville, Is., Pa. 29.25

ELECTRODES

Cents per lb, f.o.b. plant, threaded, with nipples, unboxed.

GRAPHITE			CARBON*		
Diam. (In.)	Length (In.)	Price	Diam. (In.)	Length (In.)	Price
24	84	24.75	40	100,110	10.70
20	72	24.00	35	110	10.70
16 to 18	72	24.50	30	110	10.85
14	72	25.00	24	72 to 84	11.25
12	72	25.50	20	90	11.00
10	60	26.50	17	72	11.40
10	48	27.00	14	72	11.85
7	60	26.75	12	60	12.95
6	60	30.00	10	60	13.00
4	40	33.25	8	60	13.30
3	40	35.25			
2½	30	37.25			
2	24	57.75			

* Prices shown cover carbon nipples.

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, frt allowed in quantity)

Copper
Cast elliptical, 18 in. or longer, 5000 lb lots 49.42
Electrodeposited 39.25
Brass, 80-20, ball anodes, 2000 lb or more 50.00
Zinc, ball anodes, 2000 lb lots 21.25
(for elliptical add 2¢ per lb)
Nickel, 99 pct plus, rolled carbon, 5000 lb $1.0225
(Rolled depolarized add 3¢ per lb)
Cadmium $1.70
Tin, ball anodes and elliptical $1.07 per in.

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum 76.00
Copper sulphate, 100 lb bags, per cwt. 24.35
Nickel salts, single, 100 lb bags ... 40.50
Nickel chloride, freight allowed, 300 lb 45.50
Sodium cyanide, domestic, f.o.b. N. Y., 200 lb drums 23.05
(Philadelphia price 23.30)
Zinc cyanide, 100 to 900 lb 55.55
Potassium cyanide, 100 lb drum N. Y. 48.00
Chromic acid, flake type, 1 to 20 100-499 lb drums 31.75

BOLTS, NUTS, RIVETS, SCREWS

(Base discount, f.o.b. mill)
Pct Discounts

Machine and Carriage Bolts	Full Container Price	30 Containers	20,000 Lb.	40,000 Lb.
½" and smaller x 6" and shorter	52½	56½	58½	59½
⅝" thru 1" x longer than 6"	43½	47½	50	51½
Rolled thread carriage bolts ½ in. & smaller x 6 in. and shorter	52½	56½	58½	59½
Lag, all diam. x 6" & shorter	52½	56	58	59
Lag, all diam. longer than 6 in.	44½	48	50	51
Plow bolts, ½" and smaller x 6" and shorter	52	55½	57	58

(Add 25 pct for broken case quantities)

Nuts, Hex, HP reg. & hvy.	Full Case or Keg Price
¾ in. or smaller	61½
⅞ in. to 1 in. inclusive	57½
1⅛ in. to 1½ in. inclusive	62½
1⅝ in. and larger	56

C. P. Hex reg. & hvy.	
¾ in. and smaller	61½
⅞ in. to 1½ in. inclusive	57½
1⅝ in. and larger	56

Hot Galv. Nuts (All Types)	
¾ in. and smaller	48

Semi-finished Hex Nuts	
¾ in. or smaller	61½
⅞ in. to 1½ in. inclusive	57½
1⅝ in. and larger	56

(Add 25 pct for broken case or keg quantities)

Finished	
1 in. and smaller	64

Rivets

Base per 100 lb
½ in. and larger $11.50
Pct Off List
7/16 in. and smaller 23

Cap Screws

	Discount (Packages) Bright Treated	H. C. Heat
New std. hex head, packaged ⅝" diam. and smaller x 6" and shorter	44	31
¾", ⅞" and 1" diam. x 6" and shorter	27	9
⅝" diam. and smaller x longer than 6"	14	+ 6
¾", ⅞" and 1" diam. & longer than 6"	½	+24

	C-1018 Steel Full-Finished Cartons	Bulk
¼" through ⅝" dia. x 6" and shorter	44	61
¾" through 1" dia. x 6" and shorter	27	49

Minimum quantity—¼" through ⅝" diam., 15,000 pieces; 1/16" through ⅝" diam., 5,000 pieces; ¾" through 1" diam., 2,000 pieces.

Machine Screws & Stove Bolts

Plain Finish		Discount Mach. Screws	Stove Bolts
Cartons		19	32
Bulk	*Quantity*		
To ¼" diam. incl.	25,000-200,000	9	54
5/16 to ½" diam. incl.	15,000-100,000	9	54
All diam. over 3" long	5,000-100,000	—	54

Machine Screw & Stove Bolt Nuts

	Discount Hex	Square
In cartons	16	19
Quantity		
In Bulk ⅜" diam. & smaller: 15,000-100,000	7	9

CAST IRON WATER PIPE INDEX

Birmingham 119.0
New York 131.7
Chicago 134.1
San Francisco-L. A. 141.8
Dec. 1955 value, Class B or heavier 6 in. or larger, bell and spigot pipe. Explanation: p. 57, Sept. 1, 1955, issue. Source: U. S. Pipe and Foundry Co.

REFRACTORIES

Fire Clay Brick

Carloads per 1000
First quality, Ill., Ky., Md., Mo., Ohio, Pa. (except Salina, Pa., add $5.00) $135.00
No. 1 Ohio 120.00
Sec. quality, Pa., Md., Ky., Mo., Ill. 120.00
No. 2 Ohio 103.00
Ground fire clay, net ton, bulk (except Salina, Pa., add $2.00) 21.50

Silica Brick

Mt. Union, Pa., Ensley, Ala. $150.00
Childs, Hays, Pa. 155.00
Chicago District 160.00
Western Utah 175.00
California 180.00
Super Duty
Hays, Pa., Athens, Tex., Windham, Warren, O., Morrisville 157.00-160.00
Silica cement, net ton, bulk, Latrobe 28.50
Silica cement, net ton, bulk, Chicago 25.50
Silica cement, net ton, bulk, Ensley, Ala. 26.50
Silica cement, net ton, bulk, Mt. Union 24.50
Silica cement, net ton, bulk, Utah and Calif. 37.00

Chrome Brick

Per net ton
Standard chemically bonded, Balt. $105.00
Standards chemically bonded, Curtiner, Calif. 115.00
Burned, Balt. 99.00

Magnesite Brick

Standard, Baltimore $131.00
Chemically bonded, Baltimore 116.00

Grain Magnesite

St. ⅜ to ½-in. grains
Domestic, f.o.b. Baltimore in bulk. $73.00
Domestic, f.o.b. Chewalah, Wash., Luning, Nev.
in bulk 46.00
in sacks 52.00-54.00

Dead Burned Dolomite

Per net ton
F.o.b. bulk, producing points in:
Pa., W. Va., Ohio $16.00
Midwest 16.35
Missouri Valley 15.00

METAL POWDERS

Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh

Swedish sponge iron, del. East of Miss. River, ocean bags, 23,000 lb. and over ..... 10.5¢
F.O.B. Riverton or Camden, New Jersey, West of Miss. River ... 9.5¢
Domestic sponge iron, 98+% Fe, 23,000 lb. and over del'd. East of Miss. River ..... 10.5¢
F.O.B. Riverton, New Jersey, West of Miss. River ..... 9.5¢
Canadian sponge iron, del'd in East, carloads ..... 9.5¢
Electrolytic iron, annealed, imported 99.5+% Fe ..... 27.5¢
domestic 99.5+% Fe ..... 36.5¢
Electrolytic iron, unannealed minus 325 mesh, 99+% Fe 57.0¢
Electrolytic iron melting stock, 99.84% pure ..... 22.0¢
Carbonyl iron size 5 to 10 micron, 98%, 99.8+% Fe. .86.0¢ to $1.55
Aluminum, freight allowed.. 38.00¢
Brass, 10 ton lots ..... 37.50¢ to 50.00¢
Copper, electrolytic ..... 49.75¢
Copper, reduced ..... 49.75¢
Cadmium, 100-199 lb, 95¢ plus metal value
Chromium, electrolytic, 99.85% min. Fe .03 max. Del'd ... $5.00
Lead ..... 8.90¢ plus metal value
Manganese f.o.b. Exton, Pa.. 46.0¢
Molybdenum, 99% ..... $3.60 to $3.95
Nickel, unannealed $1.00
Nickel, annealed $1.06
Nickel, spherical, unannealed #80 ..... $1.13
Silicon ..... 43.50¢
Solder powder..7.0¢ to 9.0¢ plus met. value
Stainless steel, 302 ..... 99.0¢
Stainless steel, 316 ..... $1.32
Tin ..... 14.00¢ plus metal value
Tungsten, 99% (65 mesh) $4.00 (nominal)
Zinc, 10 ton lots ..... 18.75¢ to 32.50¢

FERROALLOY PRICES

(Effective May 7, 1957)

Ferrochrome

Contract prices, cents per lb contained Cr, lump, bulk, carloads, del'd. 67-71% Cr, .30-1.00% max. Si.

0.02% C	41.50	0.20% C	38.50
0.03% C	41.00	0.50% C	38.25
0.06% C	39.50	1.00% C	37.50
0.10% C	39.00	1.50% C	37.35
0.15% C	38.75	2.00% C	37.25

4.00-4.50% C, 67.70% Cr, 1-2% Si.. 27.75
3.50-5.00% C, 57-64% Cr, 2.00-4.50% Si 27.75
0.025% C (Simplex) 34.75
0.10% C, 50-52% Cr, 2% max Si .. 35.50
8.50% max. C, 50-55% Cr, 3-6% Si .. 24.00
8.50% C, 50-55% Cr, 3% max. Si... 24.00

High Nitrogen Ferrochrome

Low-carbon type 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome max 0.10% C price schedule. Add 5¢ for each additional 0.25% of N.

Chromium Metal

Contract prices, per lb chromium contained, packed, delivered, ton lots, 97% min. Cr, 1% max. Fe.

0.10% max. C	$1.31
0.50% max. C	1.31
9 to 11% C, 88-91% Cr, 0.75% Fe ..	1.40

Electrolytic Chromium Metal

Contract prices per lb of metal 2" x D plate (⅛" thick) delivered packed, 99.80% min. Cr. (Metallic Base) Fe 0.20 max.

Carloads	$1.29
Ton lots	1.31
Less ton lots	1.33

Low Carbon Ferrochrome Silicon

(Cr 34-41%, Si 42-45%, C 0.05% max.) Contract price, carloads, delivered, lump, 3-in. x down, per lb of Cr, packed.

Carloads	44.65
Ton lots	48.95
Less ton lots	51.45

Calcium-Silicon

Contract price per lb of alloy, lump, delivered, packed.
30-33% Cr, 60-65% Si, 3.00 max. Fe.

Carloads	25.65
Ton lots	27.95
Less ton lots	29.45

Calcium-Maganese—Silicon

Contract prices, cents per lb of alloy, lump, delivered, packed.
16-20% Ca, 14-18% Mn, 53-59% Si.

Carloads	24.25
Ton lots	26.15
Less ton lots	27.15

SMZ

Contract prices, cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe ½ in. x 12 mesh.

Ton lots	20.15
Less ton lots	21.40

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5; 38-42% Cr, 17-19% Si, 8-11% Mn, packed.

Carload lots	17.30
Ton lots	18.70
Less ton lots	19.95

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.

Carload packed	18.50
Ton lots to carload packed	19.65
Less ton lots	20.90

Ferromanganese

Maximum contract base price, f.o.b., lump size, base content 74 to 76 pct Mn.

Producing Point	Cents per-lb
Marietta, Ashtabula, O.; Alloy, W. Va.; Sheffield, Ala.; Portland, Ore.	12.75
Johnstown, Pa.	12.75
Sheridan, Pa.	12.75
Philo, Ohio	12.75
S. Duquesne	12.75

Add or subtract 0.1¢ for each 1 pct Mn above or below base content.

Briquets, delivered, 66 pct Mn:

Carloads, bulk	14.80
Ton lots packed	17.20

Spiegeleisen

Contract prices, per gross ton, lump, f.o.b. Palmerton, Pa.

Manganese	Silicon	
16 to 19%	3% max.	$100.50
19 to 21%	3% max.	102.50
21 to 23%	3% max.	105.00

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, delivered.
95.50% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.

Carload, packed	45.75
Ton lots	47.25

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, f.o.b. Marietta, O., delivered, cents per pound.

Carloads	34.00
Ton lots	36.00
250 to 1999 lb	38.00
Premium for Hydrogen-removed metal	0.75

Medium Carbon Ferromanganese

Mn 80 to 85%, C 1.25 to 1.50, Si 1.50% max. Contract price, carloads, lump, bulk, delivered, per lb of contained Mn... 25.50

Low-Carb Ferromanganese

Contract price, cents per pound Mn contained, lump size, del'd Mn 85-90%.

	Carloads	Ton	Less
0.07% max. C, 0.06% P, 90% Mn	37.15	39.95	41.15
0.07% max. C	35.10	37.90	39.10
0.10% max. C	34.35	37.15	38.35
0.15% max. C	33.60	36.40	37.60
0.30% max. C	32.10	34.90	36.10
0.50% max. C	31.60	34.40	35.60
0.75% max. C, 80.85% Mn, 5.0-7.0% Si....	28.60	31.40	32.60

Silicomanganese

Contract basis, lump size, cents per pound of metal, 65-68% Mn, 18-20% Si, 1.5% max. C for 2% max. C, deduct 0.2¢ f.o.b. shipping point.

Carloads bulk	12.80
Ton lots	14.45
Briquet contract basis carloads, bulk, delivered, per lb of briquet	15.10
Ton lots, packed	16.50

Silvery Iron (electric furnace)

Si 15.50 to 16.00 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $106.50 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $93.00.

Silicon Metal

Contract price, cents per pound contained Si, lump size, delivered, packed.

	Ton lots, packed	Carloads, packed
96.75% Si, 1.25% Fe ..	23.70	22.40
98% Si, 0.75% Fe	24.45	23.15

Silicon Briquets

Contract price, cents per pound of briquets, bulk, delivered, 40% Si, 3 lb Si, briquets.

Carloads, bulk	7.70
Ton lots, packed	10.50

Electric Ferrosilicon

Contract prices, cents per lb contained Si, lump, bulk, carloads, f.o.b. shipping point.

50% Si ...	13.00	75% Si ...	16.40
65% Si ...	15.25	85% Si ...	18.10
	90% Si ...	19.50	

Ferrovanadium

50-55% V contract, basis, delivered, per pound, contained V, carloads, packed.

Openhearth	3.30
Crucible	3.30
High speed steel (Primos)	3.40

Calcium Metal

Eastern zone contract prices, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.05	$2.95	$3.75
Less ton lots..	2.40	3.30	4.55

Alsifer, 20% Al, 40% Si, 40% Fe. Contract basis, f.o.b. Suspension Bridge, N. Y., per lb.

Carloads	10.65¢
Ton lots	11.80¢

Calcium molybdate, 43.6-46.6% f.o.b. Langeloth, Pa., per pound Contained Mo $1.38

Ferrocolumbium, 50-50%, 2 in. x D contract basis, delivered per pound contained Cb.

Ton lots	$5.10
Less ton lots	5.15

Ferro-tantalum-columbium, 20% Ta, 40% Cb, 0.30% C, contract basis, del'd ton lots, 2-in. x D per lb con't Sb plus Ta..... $4.25

Ferromolybdenum, 55-75%, 200-lb containers, f.o.b. Langeloth Pa., per pound contained Mo.. $1.68

Ferrophosphorus, electric, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., $4.00 unitage, per gross ton..... $90.00
10 tons to less carload..... $110.00

Ferrotitanium, 40% regular grade 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb. contained Ti..... $1.35

Ferrotitanium, 25% low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti..... $1.50
Less ton lots $1.54

Ferrotitanium, 15 to 18% high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload per net ton $240.00

Ferrotungsten, ¼ x down, packed, per pounds contained W, ton lots delivered..... $2.95 (nominal)

Molybdic oxide, briquets, per lb contained Mo, f.o.b. Langeloth, Pa. $1.41
bags, f.o.b. Washington, Pa., Langeloth, Pa. $1.33

Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per lb.

Carload, bulk lump	18.50¢
Ton lots, packed lump	20.50¢
Less ton lots	21.00¢

Vanadium oxide, 86-89% V_2O_5 contract, basis, per pound contained V_2O_5 ..... $1.38

Zirconium contract basis, per lb of alloy
35-40% f.o.b. freight allowed, carloads, packed ..... 27.25¢
12-15%, del'd lump, bulk-carloads ..... 9.25¢

Boron Agents

Borosil, contract prices per lb of alloy del. f.o.b. Philo, Ohio, freight allowed, B 3-4%, Si 40-45%, per lb contained B
2000 lb carload..... $5.50

Bortam, f.o.b. Niagara Falls,

Ton lots per pound	45¢
Less ton lots, per pound	50¢

Corbortam, Ti 15-21%, B 1-2%, Si 2-4%, Al 1-2%, C 4-5-7.5%, f.o.b., Suspension Bridge, N. Y., freight allowed.
Ton lots per pound..... 14.00¢

Ferroboron, 17.50 min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D, ton lots.... 1.20
F.o.b. Wash., Pa., Niagara Falls, N. Y., delivered 100 lb up

10 to 14% B	.35
14 to 19%	1.20
19% min. B	1.50

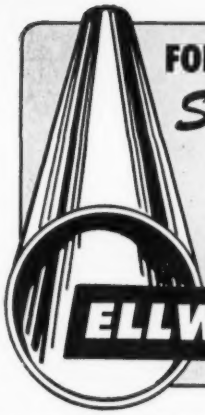
Grainal, f.o.b. Bridgeville, Pa., freight, allowed, 100 lb and over

No. 1	$1.05
No. 79	50¢

Manganese-Boron, 75.00% Mn, 15.20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd.

Ton lots	$1.46
Less ton lots	1.57

Nickel-Boron, 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, del'd less ton lots..... $2.15



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"ANYTHING containing IRON or STEEL"

Eastern Sale Draws Eager Buyers

Used machinery offered for sale at large auction brings high prices.

Equipment valued at $3 million went under the hammer during the three-day event.

▪ User-buyers and dealers, converging on Elizabeth, N. J., for a large-scale, three-day auction, offered proof there's a lot of life in the Eastern used machinery market.

The attraction was a sale at the American Type Founders Co. of surplus manufacturing equipment valued at $3,000,000. Offered in over 3000 lots, the equipment included lathes, grinders, millers, drills, boring mills, automatic screw machines, gear hobbers and shapers and a wide variety of tool attachments.

Everything Goes — Also going under the hammer were instruments, heat treating facilities, welding and woodworking equipment. Even the shelving in the tool cribs was put up for bid.

The sale, managed by the Industrial Plants Corp., was handled with precision-like efficiency.

Bidding, conducted by auctioneers mounted on loud speaker equipped hand trucks, was brisk. Purchase prices of the equipment, most of it in the 10-15 year old category, were high. One dealer who was buying a lot of equipment estimated prices to be about 50 pct that of comparable new equipment today.

Ready and Waiting — Dealers accounted for a good portion of the buying although users from a wide U. S. area were attending.

Those who bought seemed to have a good idea of just what they wanted. Auctioneers estimated that about 400 people had inspected the machines in the days before the sale began. When the equipment they wanted went up for bid they seemed to materialize quickly.

Commenting on this one of the auctioneers said, "They sure came out quickly to bid, all of a sudden you looked around and there they were."

What They Paid — Here are some of the purchases and what they cost the buyers:

A nine-speed, 3′ x 9″ column radial drill brought $3400; a 32 x 60″ heavy duty lathe went for $3750; a three bar universal horizontal boring mill sold for $14,000; a hob grinder brought $1500; a No. 3 universal miller was purchased for $8000; and a 6″ vertical shaper went for $2300.

Other equipment prices were: a 16-speed, 12 x 30, geared head tool room lathe — $4000; a sixteen-speed, No. 2A universal milling machine—$3000; a No. 2 surface grinder—$775; a 6 x 18 surface grinder with magnetic chuck—$1300; a 6″ vertical shaper—$2300; an automatic polisher—$100; a belt sander—$325; and a 17″ floor drill press—$130.

A Look Ahead—Other auctions scheduled for the near future include one at the Avco Manufacturing Corp., Crosley refrigerator plant, in Richmond, Ind., on May 7 and 8, and another at the Pressed Metals of America, Inc., plant at Marysville, Mich., on May 14-15 and 16.

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450 cu. ft. Ingersoll Rand XRE, 100# Press
100 H.P. Westinghouse Motor 440/3/60
BENDING ROLLS
6' x 3/16" Niagara Initial Type
16' x ⅜" Ransome Pyramid Type
BRAKES—LEAF TYPE
8' x 3/16" Dreis & Krump
12' x ¼" Dreis & Krump
12' x ½" Dreis & Krump No. 228
BRAKES—PRESS TYPE
8' x ¼" Geo. A. Ohl
12' x 5/16" Cincinnati—NEW
14' x ¼" Superior Hydraulic—NEW
BULLDOZERS
#27 W&W, 22" Stroke, 16" x 80" Face of Crosshead
#7 Ajax, 22" Stroke, 12" x 65" Face of Crosshead
CRANES—OVERHEAD ELECTRIC TRAVELING

5 ton P&H	56' Span	220/3/60
5 ton Whiting	48' Span	220/3/60 A.C.
5 ton Whiting	56' Span	230 Volt D.C.
8 ton P&H	55' Span	220/3/60
10 ton P&H	38' Span	230 Volt D.C.
10 ton Shepard Niles	58' Span	220/2/60
15 ton Shepard Niles	52' Span	230 Volt D.C.
25 ton Cleveland	70' Span	220/3/60

With 10 ton Auxiliary (Mill Type)
CRANE TROLLEY
10 ton P&H Type HMR Crane Trolley, Motors 440/-3/60, Magnetorque Contractor, Panel and Electric Brake, NEW
DIEING MACHINE
30 ton Henry & Wright, Roll Feed, Scrap Cutter 4" Stroke NEW 1950
FORGING MACHINES
1" to 5" Acme, Ajax, National
3" Acme Model XN, Air Clutch, NEW 1954

HAMMERS—BROAD DROP—STEAM DROP—STEAM FORGING—800 lb to 20,000 lb.
LEVELERS—ROLLER
37" Torrington, 19 Roll 1-31/32" Dia. Backed up
48" Aetna Standard, 17 Rolls 3⅜" Dia.
54" McKay, 17 Rolls, 3⅜" Dia.
108" American, 17 Rolls, 4½" Dia.
PLANER—PLATE EDGE
35" Southwark Pneumatic Holddown, Motor Driven, Capacity 1½"
PRESSES—HYDRAULIC
200 ton Farquhar Straightening Press 18" Stroke, Working Area 12' long
800 ton Clearing, 48" Stroke, Bed 48 x 48"
4500 Baldwin-Lima-Hamilton Hydr. Forging Press
PRESS—INCLINABLE
#A6½ Niagara 190 ton, 9⅜" Stroke Bed Area 32½" x 50⅝"
PRESSES—STRAIGHT SIDE
110 ton Cleveland 55D-54, 5" Stroke
Bolster 32" x 54", Air Cushion
150 ton Cleveland 65D-60, 6" Stroke
Bolster 40" x 60", Air Cushion
400 ton Warco #2-108, 18" Stroke
Bolster 66" x 108", Air Cushion
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Cleveland Style G Single End, 60" Throat
Cleveland Style W, 60" Throat
No. 1½" Buffalo Universal Ironworker
ROLL—FORMING
11 Stand Tishken Model L-M-1, Spindle Dia. 1⅛" 6½" Between Spindles, 3½" Capacity

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10" x 14" Single Stand Two High
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26" x 72" Cold Rolling Mill
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No. 1 Mesta RH LK, Capacity 2" x 12"
SHEAR—BAR
No. 12 Buffalo Armor Plate
Capacity 5" to 15" Beams & Channels
SHEARS—SQUARING
6' x 10" Ga. Niagara No. 672
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25" Blake & Johnson
36" Wean Slitting Line
36" Paxson Slitting Line
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SWAGING MACHINE
#4F Fenn, Capacity 2¼" Tubing, LATE
#6½A Fenn, Capacity 2¼" Tube 3¾" Solid 10" Die Length Hydraulic Feed, LATE
TESTING MACHINES
20,000# Baldwin Universal Hydraulic
60,000 to 100,000, 200,000 Olsen & Riehle Universal
50,000 and 300,000 lb Compression
TUBE MILL
Etna 1K Welded Tube Mill, Cut-off & Transformer Capy. ½" OD 0.28 wall to 2" OD .120 wall

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2	1000	Whse.	720	250	2300
2	500	Whse.	1200	125/250	2300
1	300	G.E.	1200	250/275	2300
1	300 (3-unit)	Al. Ch.	1200	250/300	2300
3	200	Whse.	1200	125/250	2300
2	150	Rel.	1200	125	2200
2	150	Whse.	1200	125/250	2300
1	150	G.E.	1200	250	4600/2300
1	100	Al. Ch.	1200	250	4600/2300
1	100	Whse.	720	125/250	2200
1	75	Whse.	1200	125/250	2200

DIRECT CURRENT MOTORS
230-Volt

Qu.	H.P.	Make	Type	R.P.M.
2	600	Whse.	QM	110/220
1	400	G.E.	MPC	450
1	300	Whse.	Mill	300
2	275	Whse.	QM	425/850
1	200/250	El. Dy.	Ped. Brg.	400/1200
1	180	G.E.	MPC	400
1	175	G.E.	CD-175-A	850/1025
1	125	Whse.	SK-184	575/850
1	125	G.E.	MPC	400/1600
1	80	Rel.	651-T	575/1150
1	80	El. Dy.	25-S	525/1050
1	60/75	Whse.	SK-151	250/1000
1	50	Whse.	SK	500/1500
1	50	Whse.	SK-141	250/1000
2	30/40	Whse.	SK-143	500/1500
1	35	Whse.	SK	250/1000
1	32½	Whse.	SK-150	400/1200
1	25	Whse.	SK-121	200/1200
2	15	Whse.	SK-93	575/1725
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No. 12 Gisholt, 1945, Timken bearing, 12" swing
12" x 24" Fay
16" x 33" Fay, new in 1941
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Gisholt, Simplimatic, automatic, platen type
No. 3D Gisholt Simplimatic, platen
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No. 6 LeBlond Multi-cut, swings 6" dia.
12" x 18" Porter Cable high speed, carbo, production
15" x 30" Lipe Carbomatic, hydraulic
18" x 30" cc R.K. LeBlond Federal, production
20" x 90" cc LeBlond geared head, Timken bearing, production, hard ways
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No. 1 Milwaukee vertical, 3 HP MD
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No. 2 Brown & Sharpe vertical, motor drive
No. 3 Van Norman plain, ram type, duplex
No. 10 Van Norman plain, ram type, duplex
48" Newton 2 spdl. continuous rotary
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75 ton No. 175A Bliss Consolidated, gap frame
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126 ton Model 60-D-66 Cleveland s.s. tierod frame
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100 ton HPM 2 post tierod construction
100 ton Southwark 4 post tierod construction
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10' x 8 ga.	No. 100-10,	100 ton, 12' bed

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1—Propane Gas Plant, 60,000 Gallons Storage Capacity, complete with Pumps, Valves, Heat Exchangers, etc.

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1—12" 3-Stand 3-Hi United Bar Mill—Top and Bottom Screw, complete with Pinion Stand and driven by 750 H.P. Motor, 230 Volt DC

1—144" x 3/16" Stamco Power Squaring Shear, complete with Holddown

1—40 Ton Morgan Ladle Crane, 50 ft. Span DC Current

1—#4 United Sheet Bar Shear, 26" Knives, complete with 50 H.P. DC Motor and Tables

1—500 H.P. Mill Drive, consisting of a 500 H.P. G.E. Synchronous Motor 327 RPM, and a 500 H.P. Farrell Birmingham Reducer, Ratio 10 to 1.

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AT SACRIFICE PRICES!

1—INGERSOLL RAND CAMERON Pump, Serial No. 03483210. No Motor. Year Mfg. 1948.

1—INGERSOLL RAND CAMERON Centrifugal Pump & Motor, Model No. E3-EV, Serial No. A433286, with 100 HP Induction Motor; Model 17470, 3 phase, 60 cycle, 440 volts, 1755 RPM. Pump: GPM, 450, 1750 RPM, 462' Head, including 100 HP. Electrical: GE Automatic Compensator CR-7051 K1, 3 phase, 60 cycle, 440 volts. Year Mfg. 1943.

1—INGERSOLL RAND CAMERON Pump & Motor, Size 4HMT-4, Serial No. 01443518, 100 HP G.E. Motor, 440 Volts, Type KT-114A, #5168695, Form EL, 40 degrees, Model 17470. Pump: 450 GPM, 539' Head, Hydro Test 1200, 1750 RPM. Electrical: G.E. Automatic Compensator CR-7051 K1, 3 phase, 60 cycle, 440 v.

1—INGERSOLL RAND CAMERON Single Stage Suction Centrifugal Pump, Size 4RT-4, Serial No. 04523068. 200 HP Reliance Motor, 3550 RPM, 440 volts, Form 0. #71344A1, 239A—Code G, Frame A-50586, 40 degrees. Pump: 450 GPM, 3560 RPM, 1100' Head, 1200 Hydro Test, Year Mfg. 1952. Electrical: G.E. 151-200 HP Automatic Compensator, 3 phase, 60 cycle, 440 volt. CR-7051, Dif. with Enclosure 8B max. Amps 600.

1—WORTHINGTON Pump, Style 5KF365DA7, Serial No. 1038687, Size 1¾ x 4, 30 GPM, 1200 lb. capacity 25 Hp G.E. Motor #5334, 1760 RPM. TEPC 220/440. 260 RPM. #5584203, Type KF. Model 14W168M44, Year Mfg. 1941.

1—ALLIS CHALMERS Centrifugal Pump, 3 or 4 Stage, 4" inlet, 3" outlet, 500 lb. pressure, 150 GPM new element, unit direct coupled to 75 HP Crocker Wheeler totally enclosed fan Cooled Motor for 3/60/220, 3600 RPM, mounted on base, with Skidmore primer, equipped with Cutler-Hammer Bullet #9105, 75 HP Cross-The-Line Starter.

1—ALLEN SHERMAN HOFF Hydro Seal Pump, Style 5K326B76, Serial No. HW18997, 15 HP G.E. Motor, 220/440 volts, 1750 RPM, Year Mfg. 1941.

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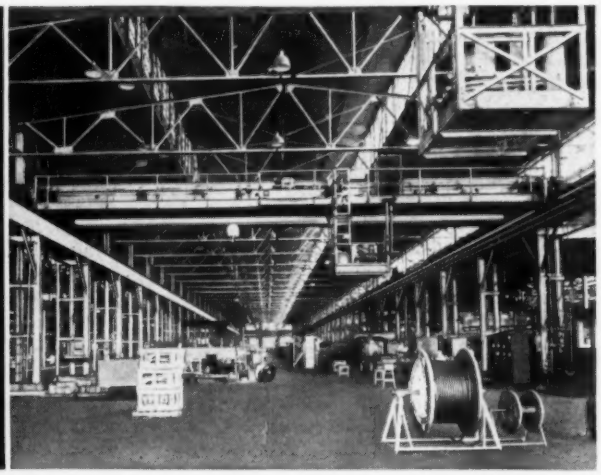

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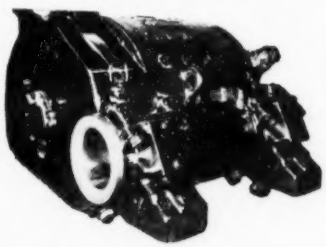

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1	1500	G.E.	MT	6600	1187
1	1100	F.M.	OVZK, B.B.	4800	1800
1	800	G.E.	MT	2300	293
1	750	G.E.	MT-573	2200	1190
1	700	A.C		2300	500
1	500	Whse.	CW	550	350
1	400	Whse.	CW	440	514
1	350	Cr.Wh.	Size 71	208/416	1765
1	350	G.E.	IM-17A	440/2200	720
1	250	G.E.	MT-424Y	4000	257
1	250	Cr. Wh.	Size 290	2300	350
1	250	Al. Ch.		550	600
1	200	G.E.	IE13 B-M	220/440	1760
1	200	G.E.	MT-557Y	220/440	1760
1	200	Cr. Wh.	20QB	440	505
1	200	G.E.	IM	440	435
3	200	G.E.	I-17AM	2200	435
1	200	G.E.	IM	2200	580
1	150 (unused)	Whse.	CW	2300	435
1	125	A.C.		440	865
1	125	Al. Ch.		440	720
1	100	G.E.	IM-16	2200	435
1	100	G.E.	IM	440	600
4	100	A.C.	ANY	440	695

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1	650	G.E.	FT-559BY	440	3570
3	500	Whse.	CS-1216	2200	500
2	450	Whse.	CS-1428	2300/4150	354
1	400	G.E.	IK	2200	500
1	300	G.E.	KT-550A	2300	1775
1	200	G.E.	IK-17	440	580
2	200	G.E.	KT-557	440	1800
1	150/75	G.E.	IK	440	900/450
1	150	Whse.	CS8568	440	880
1	150	Whse.	CS	440	580

SYNCHRONOUS

Qu.	H.P.	Make	Types	Volts	RPM
1	7000	G.E.	ATI	2200/6600	600
1	4250	C.W.	3501SL4000	6900/13800	514
1	2850	Whse.	.Sp.f	2300/4600	514
1	2800	Whse.	.Sp.f	2300	720
1	2000	Whse.		2300	120
2	1750	G.E.	ATI	2300	3600
1	735	G.E.	ATI	2200/12000	600
1	450	Whse.		2300	128.5
1	325	G.E.	ATI	440	1800
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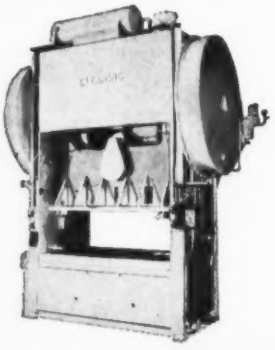

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METALWORKING BRIEFS

Capacity Jump Forecast By Blough

Fifty million tons of steelmaking capacity will need to be added by American producers during the next 18 years, according to U. S. Steel Board Chairman Roger M. Blough. U. S. Steel's commercial research indicates the necessity of such a step. Because of this outlook, Blough declared, the most difficult and persistent problem facing the management of U. S. Steel is not temporary drops in steel production, but the problem of striving to keep pace with "the enormous demand" for steel that lies ahead.

USW Signs Initial Five-Year Pact

A five-year contract just signed by the United Steelworkers and O'Neal Steel Co., Birmingham, is probably the first in the steel industry. Union officials, while hailing the agreement as a "forward step" in labor-management relations, would not predict if it would be future USW policy to seek five-year contracts. Current industry pattern is three years.

Government Wants No Aluminum

The government, continuing a policy started at the beginning of 1955, will not call for any aluminum for the stockpile in the last six months of this year. The Office of Defense Mobilization, noting that the minimum stockpile goal has been filled, says it will not exercise its option to require producers to deliver part of their output to the government. Recently producers have been exercising contract clauses which permit placing excess production in the stockpile.

Lakes Ore Hauling Below '56 Levels

Iron ore hauling by the Great Lakes fleet is running behind last year's levels. A seasonal deficit existed as of May 1 of 1.7 million tons with boats hauling 3.9 million tons as compared with the 5.6 million on the same date last year. Except for one upper Michigan point, the lag is general across all upper Lakes ports.

Powder Makers Eye Foreign Threat

Growing competition from abroad got some serious attention from metal powder fabricators during their Chicago show. With at least two German firms pushing their presses in the U. S. and an English company selling parts, American fabricators see other countries catching up in the field. Japan and Brazil may also soon enter the U. S. market. (See page 76.)

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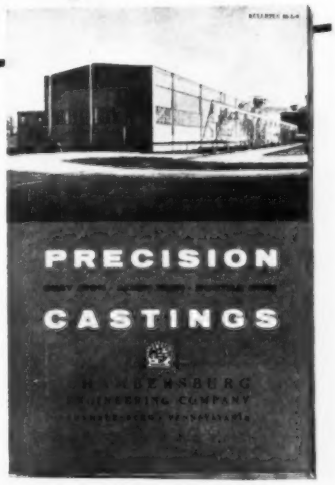

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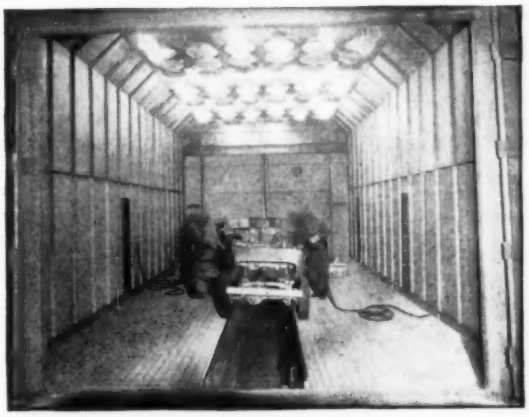

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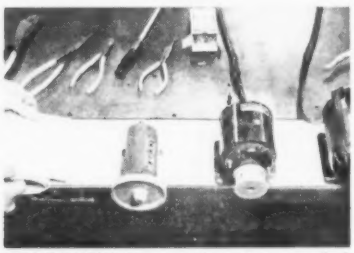

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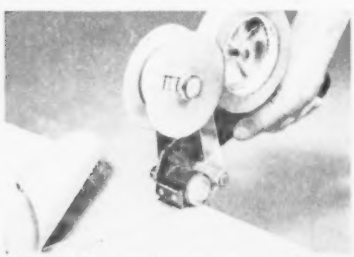

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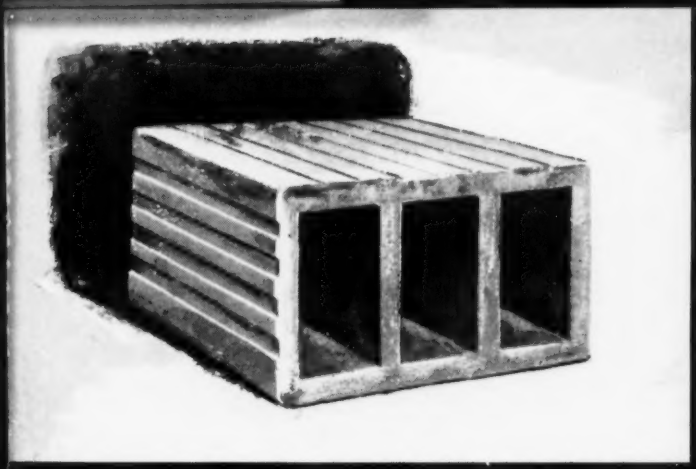

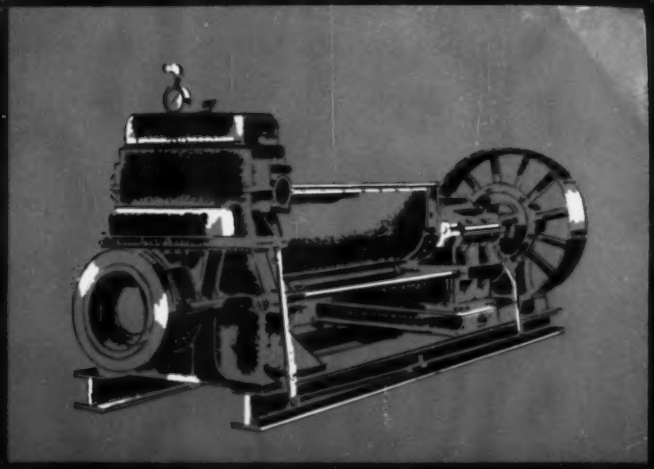

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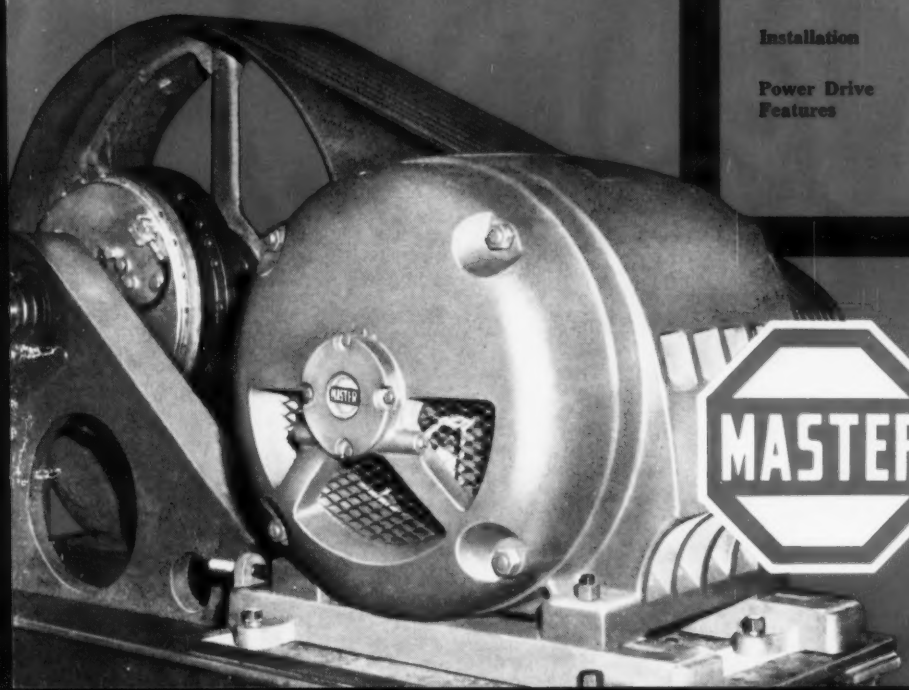

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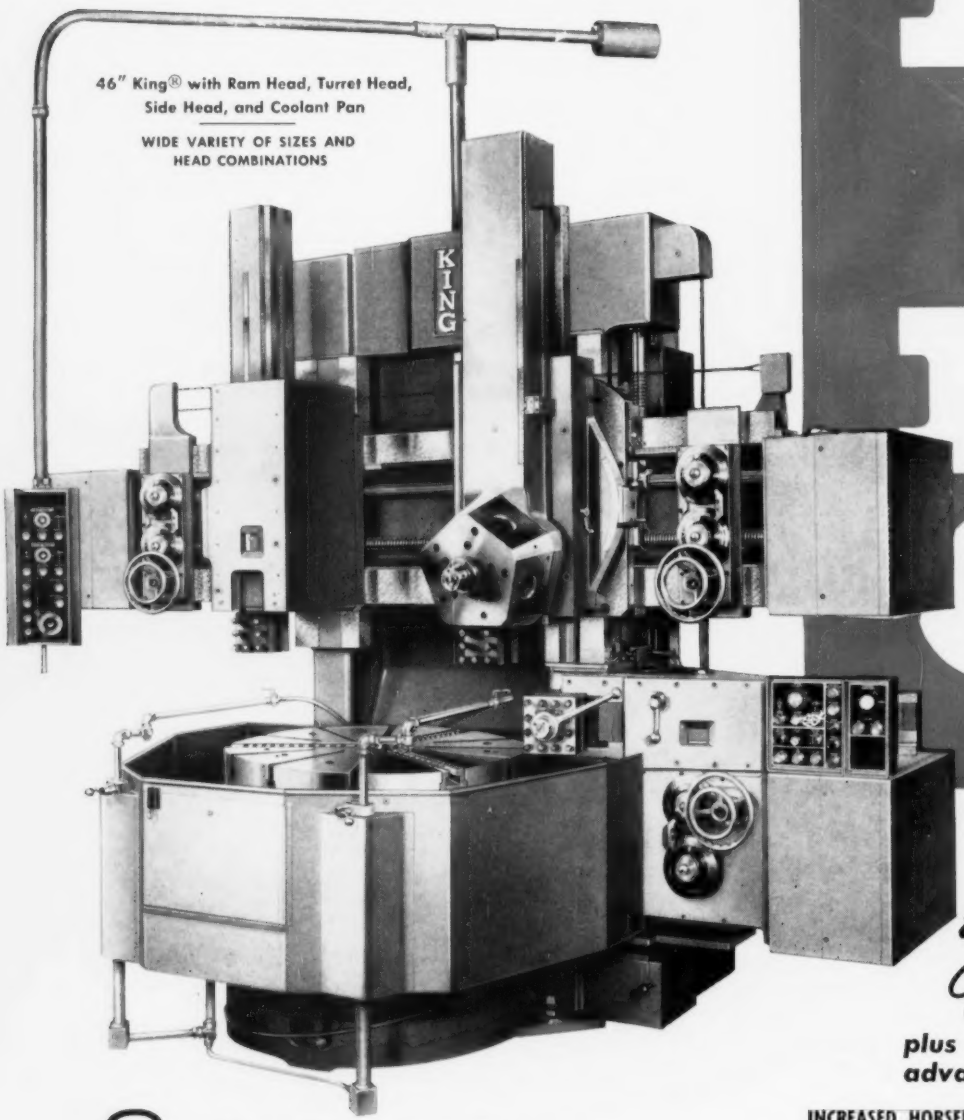

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